PROGRESS REPORT

ON

ARBORICULTURE IN THE PUNJAB

For the three years 1884-85 to 1886-87.

Price Re. 1-8-0.

Proceedings of the Hon'ble the Lieutenant-Governor of the Punjab in the Forest Department, No. 115 dated 6th March 1888.

READ—

The Report on Arboriculture in the Punjab during the years 1884 to 1887 submitted by the Officiating Conservator of Forests with his letter No. 1323, dated 1st November 1887.

REMARKS.—This is the first triennial report which has been submitted on arboriculture in the Punjab. The triennial arrangement was adopted partly because it was considered that progress in tree-planting could be better judged when the operations of three years were passed under review together, and partly in the interests of District Officers with a view to reduce the amount of reporting work demanded of them. The present Report furnishes evidence that the triennial arrangement may be expected to fulfil its object in securing a more comprehensive consideration of the subject on the part of reporting officers, as, with few exceptions, considerable care has evidently been bestowed on the preparation of the reports. The want of punctuality, however, in the submission of certain district reports to which the Conservator draws attention is to be regretted. The failure to comply with orders in this respect is especially noticeable in the reports submitted by the Deputy Commissioners of Delhi, Lahore, Hazára, and Dera Gházi Khan.

2. Orders have recently been passed by Government on the Report of the Special Committee on Arboriculture to which reference is made in the last paragraph of the Conservator's letter of 1st November, and these orders may be read with the present review as an exposition of the views of the Lieutenant-Governor on this matter. The report of the Committee contained many useful practical suggestions, but there were also a number of proposals made in it which Mr. Lyall was unable to accept as suitable for general adoption. The labours of the Committee, which consisted of the following gentlemen, —

Mr. H. C. Hill	...	*President,*
Mr. E. O'Brien	...	*Members,*
„ R. Maconachie	...	
„ E. Nicholl	...	
„ A. Reuther	...	

will doubtless have the effect of drawing more systematic attention to the subject of tree-planting in the Punjab; and with a view to securing the permanence of this effect the Lieutenant-Governor has directed the preparation of a new Manual of Arboriculture for the use of District Officers, Committees, and Boards. The manual will consist *(a)* of a sketch of the history of the subject, *(b)* of directions for arboriculture, *(c)* of the rules relating to concessions in connection with tree-planting, and *(d)* of the orders on the subject of the submission of arboricultural tables and reports. The several parts of this manual will be prepared by the Conservator of Forests, the Financial Commissioner, and in the Government Secretariat, and it is hoped that the volume will be issued during the currency of the present year. The principles which it is desired to impress on all bodies and persons interested in arboriculture in the Punjab will be fully detailed in this work, and the Lieutenant-Governor therefore proposes to deal with these questions very briefly on the present occasion.

3. It was stated in the orders passed on the Report of the Special Committee that the form of the Arboriculture Report would be considered in connection with the triennial report for the period 1884 to 1887. The Committee have recommended that a report should be submitted quinquennially instead of triennially in accordance with the scheme of five years' working plans which was advocated by them. The Lieutenant-Governor, however, has not thought it desirable to prescribe a single term over which the working schemes of every district should extend, and the present arrangement under which progress reports are submitted triennially will therefore continue in force unchanged. The revised annual forms and Statements II—VII drawn up by the Committee appear to His Honor to be an improvement on the

forms at present in use and suitable for the purpose in view. They will accordingly be prescribed in the proposed manual for general adoption hereafter. In the classification of districts in Form I it would seem desirable to transfer Hoshiárpur to the class of forest districts, and Ferozepore to that of very dry.

4. The net result of tree-growing operations on avenues during the triennial period 1884—87 has been an increase of 7,093,302 feet, or 1,343 miles in the length of district roads planted. The Lieutenant-Governor agrees with the suggestion of the Arboriculture Committee that lengths should be reported in miles and furlongs and not in feet, and entries in future years should be calculated accordingly. Since the 1st of April 1884 the area allotted to groves has increased by 4,925 acres, from 2,143 acres to 7,068 acres; but of this area 2,735 acres still remain to be fully stocked. Since the same date the area on which nurseries are maintained has increased from 101 acres to 324 acres. An area of 1,208 acres, constituting the Tilauri plantation in the Delhi district, is excluded from this account. It is remarked by the Conservator that there are now only three districts in the Punjab which do not record an area of greater or less extent under nurseries. These districts are Umballa, Montgomery and Kohát; but from the detailed report of the latter district it would appear that two small nurseries have been established in it, and that young plants are supplied for roads from the Municipal garden. In 1884 nurseries existed in ten districts only. The great importance of forming nurseries and of devising suitable working plans for arboricultural operations in each district has been specially enforced in the Report of the Arboricultural Committee and in the orders of the Lieutenant-Governor thereon.

5. Operations on canal avenues and groves continue to progress satisfactorily, but comparison with the figures reported in former years is rendered difficult by the fact that previous to 1885-86 several Divisions showed the operations on avenues in acres. The increase in the length of Provincial roads planted during the three years under report was 651,616 feet, or 123 miles.

6. The following table shows the expenditure, income and net cost of arboriculture in the districts of the Province during the past five years:—

Years.		*Income.*	*Expenditure.*	*Net Cost.*
		Rs.	Rs.	Rs.
1882-83 ...	...	32,864	99,581	66,717
1883-84 ...	...	50,944	1,39,804	88,860
	Total	83,808	2,39,385	1,55,577
	Average	41,904	1,19,692	77,788
1884-85 ...	...	51,948	1,24,262	72,314
1885-86 ...	...	66,256	1,56,317	90,061
1886-87 ...	...	94,755	1,75,159	80,404
	Total	2,12,959	4,55,738	2,42,779
	Average	70,986	1,51,912	80,926

The income shown in the above table exhibits a steady increase from year to year which is decidedly encouraging. In six districts there was a surplus of income over expenditure. Of a total income of Rs. 8,852 in the Bannu district as much as Rs. 8,299 was derived from grass in avenues, groves and afforested wastes. No explanation of this item has been furnished in the district report, and one should now be called for. The yearly increasing expenditure is a satisfactory circumstance *per se*, as it is most desirable that Boards and Committees should recognise the importance and utility of tree-growing and assign a due proportion of the funds at their disposal to its promotion. At the same time His Honor observes that the figures for the year 1886-87 appended to the present Report bear out the remarks of the Arboricultural Committee regarding inequalities of allotments in different districts. Thus in

the Lahore district the expenditure for the year 1886-87 was only Rs. 2,987, while in the adjacent districts of Amritsar and Gujránwála the total cost of arboricultural operations was Rs. 9,068 and Rs. 6,046 respectively. In Delhi apparently no money was spent by the District Board in connection with avenues, groves or nurseries, and the allotment of the Ráwalpindi district was expended almost entirely on ornamental gardens; but it is explained that planting on the roadsides is carried on in this district through the agency of the zamíndárs. Possibly this agency could be utilised throughout the Province more extensively than at present.

7. Good work is being done in the Gurgaon district, where the District Board, under the guidance of Mr. Maconachie, has taken in hand the afforestation of certain parts of the hill wastes. An interesting account of these is given in paragraph 4 of the Report. Tha reports of the Delhi, Bannu, Shahpur, Hoshiárpur, Gujrát and Siálkot districts relate to the last year only of the triennial period of 1884—87, and that from Montgomery covers two years. In all cases the triennial report should deal briefly with the whole period of three years, and the statements appended to the Provincial report should contain statistics for the same period. These triennial statements should be compiled in the office of the Conservator of Forests. The Deputy Commissioner of Jhang has submitted no report at all, and appears to be satisfied with the statement that arboricultural operations failed in this district owing to the scanty rainfall. The Lieutenant-Governor is unable to accept this explanation as sufficient. Considerable activity has been shown in planting operations in the Ferozepore district, and the success of the imported seed of the date-palm is very encouraging. His Honor regrets to notice that the members of the District Board of Ludhiána are said to have failed to exercise due supervision over the arboricultural operations under their control. No mention has been made in the report of the Shahpur district of the planting operations at Sakesar, and enquiry should now be made regarding these. The facts stated on page 66 of the Report regarding the provision of fodder by cropping trees on the Upper Sutlej Canals are extremely interesting.

8. In the orders of Government on the Report of the Arboricultural Committee it was stated that Mr. Lyall agreed with the Committee that it is to the Commissioners of Divisions that the chief administrative authority in the supervision and encouragement of arboriculture must be entrusted. His Honor hopes that these orders will be borne in mind on future occasions. In the present case two Commissioners, of the Jullundur and Deraját Divisions, only appear to have offered any remarks on the district reports which they forwarded to the Conservator of Forests, and the former alone has treated the subject in a comprehensive manner. It is not necessary that Commissioners should write a separate divisional report of arboricultural operations, as in many instances the differences of the natural conditions of districts are so great as to nullify the value of any general comparison of the results in all cases. The remarks of Commissioners should be recorded in continuation of the report of each district, and this will allow each report to be forwarded to the Conservator of Forests as it is considered and remarks are recorded on it. The district reports may also be conveniently written on half-margin. Any general remarks which Commissioners may desire to make regarding expenditure and the like can be submitted in the form of a separate brief memorandum when the last of the district reports of the Division is forwarded. In all district reports the planting operations of large Municipalities should be briefly noticed. Such explanations of district reports as may be required by Commissioners and the Conservator should at once be called for by a brief memorandum. The information wanting in various district reports and statements on the present occasion should have been supplied in this way before the Provincial report was submitted to the Local Government. The Conservator is requested to arrange with the Secretary to Government, in the Department of Public Works, for the more complete preparation of reports on tree-planting on Provincial roads.

9. With the present report Mr. Maconnachie has submitted a map of the Gurgaon district showing the extent to which the roads in the district have been stocked with trees, old and new growth being indicated by different colours. The Lieutenant-Governor would be glad to see a similar map of each district in the Province submitted with the next triennial report. The symbols and references to be used in the map should be arranged by the Conservator and should be the same for each district. The ordinary skeleton maps which have been prepared for all districts will no doubt be found suitable for illustrating arboriculture as well as other reports. Such a map would indicate at a glance the extent of the progress made up to date in tree-growing on avenues in each district, and it would be convenient if the localities of nurseries and groves were also indicated upon it. Further orders regarding the form of district triennial reports and of the Provincial report will be issued in connection with the manual to which allusion has been made in paragraph 2 above.

10. The Conservator has not brought to the notice of Government in the present report instances in which the efforts made by local officers and local bodies appear to him to merit special commendation. This should be done in all future reports. To judge from the data before him, the Lieutenant-Governor is disposed to think that the efforts made in the Gurgaon, Rohtak, Simla, Ferozepore and Jullundur districts deserve to be specially mentioned.

ORDER.—Ordered, that the above remarks be printed and circulated with the Report as usual.

Also, that they be published in the *Punjab Government Gazette*, and be forwarded with the usual number of copies of the Report to the Government of India in the Department of Revenue and Agriculture.

Also, that they be forwarded to the Secretary to Government, Department Public Works, with reference to concluding portion of paragraph 8.

By order of the Hon'ble the Lieutenant-Governor,

H. C. FANSHAWE,

Offg. Junior Secretary to Government, Punjab.

Punjab Government Press, Lahore.—6-3-83—280.

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No. 1323.

FROM

A. E. WILD, ESQUIRE,

Offg. Conservator of Forests, Punjab.

To

THE JUNIOR SECRETARY OF GOVERNMENT, PUNJAB.

Dated Lahore, 1st November 1887.

SIR,

I have the honor to submit the Progress Report on Arboriculture in the Punjab for the three years 1884-85 to 1886-87. The last narrative report was that for the year 1883-84. For the years 1884-85 and 1885-86, statements only were submitted.

In the present report I have followed the sequence given in the report for 1883-84. Statements for the three years are, however, not incorporated; those for 1884-85 and 1885-86 having been submitted separately, I considered it merely necessary to furnish those of the last year, 1886-87.

I greatly regret the delay which has been unavoidable in the submission of this report. It is, however, the first tri-ennial report as yet prepared, and in consequence, and on account of numerous errors and omissions in the statements forwarded by Districts &c., certain enquiries and references were rendered necessary, which required time.

In addition, in spite of every endeavour to secure the punctual submission of the District reports, that of the Delhi District was not received before the 23rd September, and it was merely a desire on my part to render the report as complete as possible, which induced me to defer its submission, and so run the risk of a rebuke for want of punctuality rather than on the score of incompleteness. Had I omitted all reports not received by the 1st September, the date on which the Provincial Report was due to Government, I should have had to send incomplete returns from no less than four Districts. If I have erred I trust I may be excused.

In compliance with the orders contained in para. 2 of the Review on the Statements for 1885-86 I append a list of those reports received late.

Statement showing dates of receipt of Arboricultural Reports from Districts.

Districts.	Date of reminders issued.				Date of receipt in Conservator's office.
From Commissioner, Derajat—					
Dera Ismail Khan	...	...	..	...	21st July 1887.
Muzaffargarh	...	...	..	...	
To all Commissioners, Punjab	No. 617, dated 21st July 1887.				
From Commissioner, Lahore Division—					
Mooltan	...	...	.	...	26th ,, ,,
Jhang	...	..	...	...	
Montgomery	...	...	...	...	
From Commissioner, Peshawar—					
Peshawar District	...	...	...	...	1st August ,,
From Commissioner, Lahore—					
Gurdaspur District	...	...	...	...	3rd ,, ,,
From Commissioner, Jullundur—					
Jullundur District	...	...	...	...	8th ,, ,,
From Commissioner, Lahore—					
Lahore District	...	...	...	...	10th ,, ,,
From Commissioner, Peshawar—					
Peshawar District	...	...	...	...	19th August 1887, (narrative report).
From Commissioner, Lahore—					
Amritsar District	...	...	...	...	21st August 1887.
From Commissioner, Derajat—					
Bannu District	...	...	...	...	28th ,, ,,
From Commissioner, Rawalpindi-					
Gujranwala	...	..	..	...	
Gujrat	...	.	...	...	
Shahpur	...	...	...	...	30th ,, ,,
Sialkot	...	..	...	..	
Rawalpindi	...	...	...	...	
From Commissioner, Delhi—					
Karnal	...	..	..	..	
Hissar	...	...	...	...	
Rohtak	...	...	...	...	31st ,, ,,
Umballa	...	...	...	...	
Simla	...	...	...	...	
From Commissioner, Peshawar—					
Hazara District	...	...	...	...	3rd September 1887.
From Commissioner, Lahore —					
Lahore District	...	...	...	...	3rd Sept. 1887, (narrative report).
From Deputy Commissioner, D. G. Khan...	...	...	...	...	21st September 1887.
From Commissioner, Delhi—					
Delhi District	...	...	...	...	23rd ,, ,,

Under instructions contained in Government letter No. 145, dated 29th March 1886, to address of Senior Secretary to Financial Commissioner, and in accordance with the suggestions put forward in para. 10 of the Review of His Honor the Lieutenant-Governor on the report for 1883-84, a Committee sat at Lahore on the 26th April and following days, to consider the best means of encouraging the development of arboriculture in the Punjab, and drew up a report which was forwarded to the Financial Commissioner. Government orders having, however, not yet been passed on the recommendations therein made, the form or substance of the present report has in no way been influenced by them.

A.—General Remarks regarding the seasons.

1. The rainfall of the past year has on the whole been much below the average. The greatest deficiency occurred in the arid Districts, and in Peshawar and Kohat, where, excepting Hissar, not only was the actual fall scarcely more than half the average, but there was an almost total absence of the usual cold weather rain, resulting in some Districts in an actual drought. In the other Districts of the Province the figures do not differ much from the average. Of the dry Districts, 6 registered a slightly diminished fall, while 3 were above the average. The Forest Districts, with the exception of Gurdaspur, all show a rainfall somewhat less than usual.

The year does not therefore compare favourably with the two previous ones, in which the rainfall was in both years in excess of the average.

The rainfall figures furnished by Districts are generally speaking not to be relied on, and the figures for the past year have therefore been obtained from the Meteorological Reporter.

B.—DISTRICT ARBORICULTURE BY GOVERNMENT AGENCY.

(*a*).—*General.*

1. The following statement shows the progress made in arboricultural operations on avenues during the three years 1884-87 in totals for each year :—

Year.	Length of roads on which avenues have been planted or are in course of construction.	Length of single lines stocked with trees or established plants at the beginning of each year.	Length of single lines planted during each year.	Length of single lines on which cultivation has failed, or on which trees or established plants have been destroyed or felled.	Length of single lines stocked with trees or established plants at the end of each year.
	Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*
1884-85 ...	47,407,276	25,072,360	1,840,373	1,348,284	25,564,449
1885-86 ...	48,219,934	25,564,449	5,072,717	2,151,861	28,485,305
1886-87 ...	55,360,248	28,485,305	5,125,026	1,444,669	32,165,662
Figures for the three years.	55,360,248	25,072,360	12,038,116	4,944,814	32,165,662

It was requested that special attention might be paid to the accuracy of the returns for 1886-87, and all errors and omissions of former years adjusted. In many Districts this has been done, but there is still much to be desired in this

respect, though the length of avenues and areas stocked at the end of 1886-87 may be considered as more than approximately correct.

It will be seen that a length of 8,058,306 feet has been added during the three years to the total length of the district roads in the Province on which avenues have either been planted or are in course of construction, increasing the length of 47,301,942 feet under operations in 1883-84 to 55,360,248 feet at the end of 1886-87. Single lines of 25,072,360 feet had been successfully stocked at the beginning of the period under report; during the three years 12,038,116 feet have been planted out, while failures or deaths have occurred on 4,944,814 feet. Thus there has been a net increase of 7,093,302 feet in the length of established avenues, and assuming that each avenue consists of two lines only, there remains therefore an unplanted length of district roads of 39,277,000 feet against 34,400,000 in 1883-84.

The above figures however include errors and omissions of former years, and can therefore scarcely be used for comparison. Of the length shown as planted in 1885-86, no less than one half, or 2,538,971 feet, was due to more careful measurements and to the inclusion of lengths previously planted, but omitted from former returns, the actual figures for the year being 2,533,746 feet instead of 5,072,717 feet. In like manner former discrepancies materially alter the figures for the past year, and when deductions as noted in Statement I are made, reduce the length planted during the year from 5,125,026 feet to 1,990,966 feet and the failures from 1,444,669 feet to 757,308 feet.

It is remarkable that though the past year was towards its close very unfavourable to arboricultural operations, the net results, taking the actual figures, are better than those of the two previous years, though behind those of 1883-84.

The most noticeable feature is that while throughout the Province the winter rains generally failed, and in some Districts there was actual drought, the failures recorded during the year are much below those of former and far more favourable years.

No explanation has been given of the large losses in the Delhi and Lahore Districts in 1885-86 noticed in the review on the report for that year.

3. The subjoined is a statement showing the operations carried out in groves :—

Year.	Area on which groves have been planted or are in course of construction.	Area stocked at the beginning of each year.	Area planted during each year.	Area of failures.	Area stocked at end of each year.
	A. R. P.	*A. R. P.*	*A. R. P.*	*A. R. P.*	*A. R. P.*
1884-85 ...	2,818 2 12	1,786 1 26	650 0 34	37 2 7	2,399 0 13
1885-86 ...	5,887 2 24	2,399 0 13	2,255 2 19	476 1 11	4,178 1 21
1886-87 ...	7,068 3 2	4,178 1 4	422 2 30	267 2 36	4,333 1 15
Figures for the three years.	7,068 3 2	1,786 1 26	3,328 2 3	781 2 14	4,333 1 15

Since the 1st April 1884 the area allotted to groves has increased by 4,925 acres from 2,143 acres to 7,068 acres. Of this area 4,333 acres are said to be fully stocked, leaving a balance of 2,735 still to be taken in hand. An area of 3,328 acres was added during the period under report, while failures occurred on 781 acres, thus the net increase has been 2,547 acres. This happened chiefly in the Bannu District where so large an area as 1,084 acres was added in the year 1885-86, though evidently not the work of that year. The operations of the past year show a net increase of 155 acres; they are less than those of the two previous years, but compare favourably with the figures of 1883-84, in which year 160 acres were planted, while failures occurred on 104 acres. The failures of the year were small; they happened chiefly in the Rohtak and Jhang Districts and were due to the exceptional dryness.

(*b*).—Detail of work done—Avenues and Groves.

Arid Districts.

4. Steady progress has been made in the Muzaffargarh District and the trees planted are reported to be in good condition. Only 7½ miles of the road to Alipur remain unplanted; on the poorer soils, shisham has been abandoned and farash substituted, which ought to give better results. The Commissioner recommends ber and jhand being more extensively planted, and I entirely agree with his remarks. The success of the mangoe is doubtful, 200 plants put out in 1885-86 failed, but were replaced and the new ones are doing well. The report confuses groves with nurseries; there has been an addition in the former of 48 acres. The apparent large number of deaths on avenues is attributable to the entry of 3,33,478 feet in 1886-87, to correct former errors, the length of actual failures of that year being only 5,560 feet.

5. The great cost of watering in the Mooltan District necessitates operations being limited. The opening out of the Sidnai Canal will do much however to lessen this difficulty, and already an area of 45 acres on this canal has been given up for a grove and nursery on which the initial cost will be about Rs. 1000. Further use is being made of the canal, and all roads within its influence are being rapidly planted up.

6. In the Dera Ghazi Khan District, operations though on the whole satisfactory were much retarded by scanty rainfall and unseasonable heat. Avenues were extended by only 1½ miles, on which 450 trees were planted, and about 1,500 gaps were filled up with new plants. The shisham is said to be the only tree really suited to the District though the kikar does well on kallar soil. The suggestion of the Deputy Commissioner to use the better kind of mangoe for groves is, I think, worthy of trial, while it is satisfactory to learn that the people are becoming generally alive to the advantages of planting orchards, which are said to be greatly on the increase. No extension of the Chhabri-Kot-Haibat plantation took place during 1886-87 on account of the impossibility of irrigating more of the land. On the kallar soils of this plantation I would recommend a trial of the species said to thrive on saline soils *viz:* "Pithecolobium saman."

It would be a matter for regret were planting operations on the Dera Ismail Khan and Mithankot roads discontinued, and it is to be hoped that the Provincial contribution may not be permanently withdrawn.

7. There is nothing particularly noteworthy in the Dera Ismail Khan report. A large number of trees died on the Bhakkar and Jhang road owing to continued drought in the Thal.

8. The Montgomery report treats merely of the two years 1885-87; little progress was made and a large portion of the District remains unplanted. 3 acres were added to groves; work in this District needs concentration.

9. The Deputy Commissioner Jhang reports that arboriculture failed from want of rain and for this reason sends no report. He refers no doubt to the year 1886-87 only; but a glance at the statements will show that no advancement has been made and that both avenues and groves have decreased since 1884. Increased activity is however promised which appears necessary.

10. The Deputy Commissioner Bannu also remarks only on the year 1886-87 which being unfavourable to arboriculture, operations in part of the District were consequently unsatisfactory. It is to be regretted that all the more favourable sites for planting being already occupied, work progresses with less energy and success. It will be a decided advantage to plant out the treeless road to Dera Ismail Khan, and the establishment of a nursey at Gandi Khan Kheyl to further this project should not be lost sight of. The proposal to send a young man from the District to be trained at the Dera Dun Forest school is a move in the right direction and one worthy of example. Some further information seems called for with regard to the 1,084 acres groves which though brought on the statement in 1885-86 seems to date from some previous year

11. The report of the Shahpur District is also for the year 1886-87 only. The year was unfavorable and little progress was made. During the three years however, avenues have been extended by 91,738 feet while an area of 69 acres has been added to groves. Arboricultural operations in this District are however in good hands, and much is hoped for from the experience of Dr. Henderson. Some kikar groves and the trees along the Bhera-Shahpur road were thinned out. A grove of shisham on the bank of the Jhelum at Lagri being threatened by the river had to be cut down.

Operations at Sakesar were apparently begun in 1884, and if carried on during the last three years, on the plan advocated in the Provincial Report for 1883-84, should have made some progress. It would have been interesting to have learnt the results, but this project finds no place in the present report. It is to be hoped that it has not been abandoned.

12. The Hissar District now including half of Sirsa is for the first time placed among the Arid Districts in accordance with the new classification adopted by the Arboricultural Committee. It is reported that owing to the general unfavourableness of the seasons, arboriculture has not been a success during the three years, and the Deputy Commissioner recommends that operations be restricted to limited areas. This is good advice, it is of no use to attempt more than can be done thoroughly and properly; and by the addition of nurseries, and better supervision much can be attained. No progress in groves is reported, but a number of trees appear to have died.

13. The report from the Ferozepore District which shows considerable and satisfactory progress during the last year under report was prepared by the Secretary to the District Board, who translated and circulated the rules drawn up at the Arboricultural Committee for the guidance of the establishment, but

with what result is not stated. There has been a great reduction in the cost of planting consequent on irrigation by District Canals, the rate decreasing from Rs. 8·55 per 100 in 1885-86 to Rs. 3·32 during 1886-87. During the two years 1885—87, 2,73,060 trees were planted, of which 63,139 are reported as having died. 1,96,960 were planted in avenues, the rest in groves. The operations of 1886-87 far exceeded those of previous years and comprised the planting of 1,39,712 trees in avenues and 63,956 on 28 acres of groves of which the failures were 20 and 34 per cent. respectively. The Commissioner remarks on the inaccurary of the statements of this District and apparently there is some explanation called for. It is quite true that notwithstanding there must have been considerable failures year by year and failures have been shown in the District returns, still as the length of line stocked at the end of the year in those returns has, invariably been given as the new plantings of the year, *plus* the length stocked at the beginning of the year, it has, I can only imagine been assumed when preparing the printed statements, that the failures must have been replenished during the year under report, and only the new work entered in column III. I do not agree with the conclusion arrived at by the Commissioner, but in either case the procedure is incorrect and greater attention should be required in future. Latterly, early spring planting has been resorted to, in addition to rains planting, and I recommend its adoption in other Districts where the seasons are short and more time is required. The Darogah who is in charge of the District arboricultural operations has been sent to the Changa Manga plantation for practical training, and will no doubt greatly improve himself. Where it is not possible to make use of the Dehra Dún Forest School this plan might with advantage be followed elsewhere. Experiments with the Australian salt bush did not succeed, but fresh sowings have lately been made. The success attendant on Mr. O'Brien's first endeavour to cultivate the date palm is very encouraging. More than 3 maunds of Persian Gulf and Mooltan seed was sown on over 2 acres, and the young plants are reported as mostly flourishing, some of them being 10 to 12 inches in height. Mangoes also came on well. The Deputy Commissioner is very hopeful of eventual success and improvement in the food supply of the district.

A report on the Kehruwalla plantation is attached to the report of the Ferozepore District. 423 acres were acquired for Rs. 5,179 in the late Sirsa District, of which 45 have been planted to date The expenditure incurred is only a little in excess of the income received from the unplanted portion and the future prospects are encouraging.

I would recommend that the distance of the ditches be reduced to 10 or 12 feet and that shisham be mixed with the kikar.

Very Dry Districts.

14. From Peshawar there is nothing particular to record. 29,697 trees have been planted, but the results are not given, and it seems doubtful whether they are commensurate with the large cost of Rs. 13,592. The endeavours of the Deputy Commissioner to ensure success by planting with earth and by affording better protection are commendable, as are also the operations conducted by Captain Deane, Assistant Commissioner, Mardan.

15. In Kohat the seasons were generally unfavourable, but operations were not much affected, the trees receiving water from the Toi and other streams. 3,239 trees were put out, of which 1,200 died. The scheme prepared by the District Committee in 1884 will no doubt be further elaborated on the recommendations of the Arboricultural Committee being promulgated. There

are only small funds allotted to arboriculture and much cannot be accomplished with Rs. 500. Willows can only be recommended where there is plenty of moisture and under this condition cuttings invariably succeed.

16. The prolonged drought of the latter part of 1886-87 seriously hampered operations in the Rohtak District. 24,091 trees were planted out, of which 4,287 died. Portions of the Jhaggar Birs were enclosed with a view to form fuel and fodder reserves and a plan has been sanctioned for improving the Birs. The Deputy Commissioner doubts whether the result will be worth the cost, but in absence of the plan I should not advise its being put aside without careful consideration. Up to the present, however, the accumulation of cut grass in the Birs is still undisposed of and it seems doubtful whether they are required as fodder reserves. A plan has been decided on to plant 3 miles of road in each tahsil yearly, which requires further elaboration. Groves have suffered considerably and repairs seem called for.

There was a severe storm in May 1886 which greatly damaged many trees on the different roads and largely increased the revenue of the year.

The Deputy Commissioner complains of the unsuitabilty of the district generally for tree-planting, and many of the trees put out are reported as stunted and deformed. This could to a certain extent be avoided by artificial means, but the expense would be great.

17. In Lahore the rainfall was below the average and unseasonable, yet reports of Tahsildars on the condition of existing avenues and groves are more satisfactory than they have been in previous years. Planting and tending road-side trees were the chief works carried out, though the planting of shelter-giving trees on road-side groves is also receiving attention. The Deputy Commissioner reports 33 miles of avenues added during the three years, but I am unable to reconcile these figures with the 7,58,720 feet shown by the statements, even after deducting the work done in municipalities. No explanation of the large loss of 4,04,710 feet in 1884-85 has been given. New groves have been formed near encamping-grounds at Chunnian, Bhai-Phiru and Luliani, and 50 trees have been planted at Kasur to replace dead ones. Objection is taken by the Deputy Commissioner to the operations being expressed in the statements in feet and proposes miles, a proposal which has already emanated from the Arboricultural Committee.

18. In the Karnal District the rainfall was about the average in 1886-87 and much above it in the two previous years ; still the losses compare favourably, being ·9 against 7 and 11 respectively.

The arboricultural operations in this district are scarcely worthy of note, and I agree with the Deputy Commissioner that more attention is necessary in this respect. They comprise transplanting of 8,014 trees to replace 3,802 lost. The report mixes up nursery plants with established trees, which should be avoided in future. Nurseries are constantly changing both in area and in the number of seedlings they contain, when possible of enumeration, and I recommend that in future they should be kept distinct.

The method of making Local Boards' members responsible for the protection of trees within a certain limit of their residences will, I am of opinion, avail little. The large incomes of the municipalities ought to contribute more than the paltry sum they do, to arboricultural operations.

DRY DISTRICTS.

19. In the Jhelum District operations were retarded consequent on scanty rainfall, chiefly in the Talagang tahsil. Nevertheless during the three years 38,922 trees were planted, of which 6,541, or 16·80 per cent. only succumbed.

20. But little new work was done in the Gujranwala District, the filling up of gaps constituting the chief operations.

In all 15,436 trees were planted, 11,110 to fill blanks and 4,326 on new roads. Sowing in drills, where the soil is good, is also undertaken. The seasons were generally favourable though the rainfall of the last two years was unseasonable.

21. Gurgaon has been fortunate in its Deputy Commissioners, and well directed energy has left its mark. The report attached evinces too the great interest taken in arboricultural operations by the present Deputy Commissioner, Mr. Maconachie. 1,300 trees have been put out. There is only one grove which is steadily progressing and will shortly be ready for thinning.

One of the great features of the report is the conservancy of hill areas, which beginning in 1883 now embraces an area of 1,732 acres entirely closed to grazing and 2,000 acres closed to cutting. It is gratifying to learn from the Deputy Commissioner's report that the area now closed for only four years has already thousands of young hill trees on it, and that the areas of 1885 show a great difference. It is very possible, I think, that more than 7 years will be required to secure the trees from goats. The Deputy Commissioner proposes a scheme for the next three years which will be further elaborated hereafter, and attaches a very useful map showing the present state of the development of road avenues, which, though excellent in itself, could not well be printed.

22. In Amritsar 4,315 trees were planted along new roads, in addition to the filling up of gaps, on which 11,138 trees were used. On some road-sides spontaneous growth is showing itself. Complaints are made of the small funds at disposal for arboriculture, but it is possible to accomplish a great deal with Rs. 8,000.

23. The report of the Delhi District treats merely of the year 1886-87. The rainfall was slightly in excess of the average, and though tree-planting is reported to be making good progress on metalled roads, the operations of the year have not been extensive. 450 trees only were planted, while 9,000 died owing to bad soil and the ravages of white ants. Planting is not resorted to on kutcha roads, sowing being found an efficient and cheap plan of extending avenues, but the non-success of the work of the year under report, in which though germination was good the young plants were destroyed by heavy rainfall, makes it doubtful whether it can be advantageously carried out on the roads in question. At any rate a change in the method of sowing seems called for, and I would here advocate sowing on ridges. Kikar sowings on irrigation bands were, as might be expected, more successful. Of 2,245 trees planted at police posts 470 failed.

Operations in connection with the planting of selected spots taken up in 1883-84 have been only partially successful, but it is satisfactory to learn that the subject is nevertheless engaging attention.

No report has been received from the Municipal Committee for reasons explained in a note by the Secretary. It would have been interesting to have learnt the progress of the attempt to clothe the Ridge, commenced in 1883-84.

24. The absence of winter rain in the Jullundur District in 1886-87 necessitated the employment of a large watering establishment. The chief avenue operations were the completion of the Jullundur and Thandah road, of which 3 miles were planted; the planting of 9 miles on the Jullundur-Nurmahal road; 7½ miles on the Nakodar-Sidhwan road, and 8 miles on the Rohan-Phillour road. About 75 per cent. died on the latter road, being far away from the tahsil, supervision was inefficient and watering neglected. Gaps and blanks have been filled up. The work was carried out according to the provisions of a plan framed in 1885 and may be considered satisfactory. Three of the existing groves were washed away by the river, reducing the number to 20.

25. The report from the Ludhiana District shows a deplorable state of affairs, explained by the Deputy Commissioner as being due to the transfer of arboricultural operations to the District Boards. No doubt such transfers have in some instances led to bad results, but where the Deputy Commissioner himself takes an interest in the work this should not be the case. 3,607 trees were planted on road-sides, at the very high cost of more than Rs. 1 a tree. The zamindars are said to strongly object to avenues of any kind as tending by their shade to reduce the cultivated land, and the Deputy Commissioner proposes to confine operations. I would, however, suggest some other way out of the difficulty and perhaps that advocated in the Gurdaspur District might be successful.

26. The rainfall in Rawalpindi was insufficient, and during the latter part of 1886-87 there was actual drought; notwithstanding good progress has been made and 1,24,424 trees were planted of which, however, 63,199 failed. Operations are limited to the plain part of the District, and are chiefly carried on through the agency of the zamindars. In addition 7,266 trees were planted around public buildings and 1,039 in the different municipalities. 176 acres of groves were purchased from the zamindars by the District Board for Rs. 6,000 in 1885, and the area has therefore considerably increased.

27. There is no progress reported from the Hoshiarpur District, operations being limited to the maintenance of existing roads and the planting out of 10,212 trees to fill gaps. With so large an establishment at disposal more might have been done, and it is evident better supervision and control is urgently required.

FOREST DISTRICTS.

28. The report of the Gujrat District is very meagre, and contains no account whatever of the work done; it has, however, to judge from the statements been very small, and is not worthy of notice.

29. In the Gurdaspur District 13,633 trees have been planted on 1,81,384 feet of single line of road. Statement No. I shows, however, 30,96,572 feet as stocked during the three years, and some explanation should have been given of this large discrepancy which is apparently due to the inclusion of omissions of former years. Operations have hitherto been restricted for want of planting

material, but now that nurseries have been formed there will be no further difficulty in this respect. It is satisfactory that suitable trees only are now selected for avenues. 21 acres of waste land in the Civil station were planted with mangoes and fenced. Complaints regarding the destruction of crops through avenue planting also come from this District; injury would no doubt be lessened by planting the trees further from the fields, and this, where the roadway is not thereby much narrowed might with advantage be done.

Adverting to the large deficit in this District of Rs. 10,032 during the three years, the slack market and low prices obtained, the Deputy Commissioner, on the ground that the District is generally well wooded, proposes the curtailment of operations, but I very much doubt the advisability of such a step though possibly a revision of establishment might be beneficial.

30. Progress in the Umballa District has been slow, and as explained by the Deputy Commissioner only 13,052 trees have been planted, 883 on 9,787 feet of new roads and 12,169 to fill up blanks—2,233 of these died, in addition to 2,954 matured trees.

31. The report of the Sialkot District treats merely of the year 1886-87. It states that the rainfall was above the average and unseasonable, but this is not borne out by the Meteorological Reporters statements which show a decrease in rainfall and would better account for a season unfavorable to arboriculture. But little progress is recorded. Great damage was done by storms and frost.

32. In the Simla District no arboricultural operations are undertaken. Lists of trees planted about the station accompany the District Municipal report.

33. The filling up of gaps formed the chief work in the Hazara District where the rainfall was above the average. The experiment to afforest the Sarbun hill close to Abbottabad is worthy of notice, and should, if possible, be extended.

34. Steady progress has been made in the Kangra District where 9,40,192 feet were planted with a loss of 5,11,601, representing 46 per cent. success. These figures do not agree with the Statement I now submitted, which has been altered to allow of omissions and errors of former years. The work in the Hamirpur tahsil showed the best results, and that undertaken in Kulu, Plach, Palampur and Nurpur is also considered fair. The filling up of gaps constituted the chief operations in Kangra and Dera, where nearly all the main roads already possess good avenues. It is much to be regretted however, that the limited means at the disposal of the District Board greatly hampers systematic operations and many young trees die annually for want of watering, and until further funds can be provided I would recommend attention being paid to the maintenance of existing avenues rather than to extension.

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c.—Government Gardens.

The remarks on Government gardens made in the last narrative report have received but little attention, and it has again to be observed that from many Districts much more useful and interesting information might have been vouch-

safed. In 1883-84 it was stated that in 14 districts Government gardens were not mentioned at all; in the present year only 10 districts notice them.

There is a Municipal garden at Dera Ismail Khan, but here our information ends.

From the Kutchery and Government gardens at Dera Ghazi Khan some 2,000 trees, chiefly fruit trees were distributed during the year 1886-87. The Burg Kushi and Khar gardens at Fort-Munro in this district are reported as progressing satisfactorily and many trees have been planted out from them on to the Fort-Munro hill.

The Municipal garden at Kohat is greatly improving under the supervision of the Deputy Commissioner. The deficit is steadily decreasing, and in 1886-87 was only Rs. 121; it is shortly expected to be self-supporting. The introduction of select fruit trees is desirable.

Fruit tree cuttings were planted in the gardens at Jhelum, Sheikupura, Chak-Jamal, Choya Saidan Shah and Pind Dadan Khan in the Jhelum District and are said to be flourishing.

It is mentioned that in the Delhi District there are three Ornamental gardens, the Queens garden, the Roshnara, and the Kudsia Bagh, but further than that they have brought in an income of Rs. 3,149 with an expenditure of Rs. 9,843, nothing is noticed regarding them.

The five gardens in the Jullundur District are chiefly maintained by the District Board. With the exception of the Nawashahr Baradari gardens, none are yet self-supporting, but the revenue is steadily improving. The Empress or Town-Hall garden is more ornamental than lucrative.

In the Rawalpindi District there are gardens at Rawalpindi, Chattar (on the Rawalpindi and Murree road), Hassan-Abdal, Futtehjang and Pindigheb. 3,102 fruit trees were planted in them during the last three years and 2,419 were distributed to zamindars and private individuals. The English apple and pear trees given away in the Murree tahsil are doing well, and arrangements have been made to increase the supply by the formation of a nursery at Charra-Pani, 10 miles below Murree on the main road.

Between fifteen and sixteen thousand fruit and other tree cuttings were set in the garden at Gurdaspur, but many died owing to want of rain. Mangoe, Mawa and Eucalyptus were also sown or planted.

Ornamental gardens exist at Dharmsala, Palampur, Kulu, Hamirpur and Dehra, but no detailed account of them has been vouchsafed by the Deputy Commissioner of Kangra.

In accordance with the orders contained in the latter part of para. 7 of His Honor's review on the Arboricultural Report for 1883-84, a report on the Simla Municipal Orchards for the year 1886-87 has been extracted from the annual Report of the Simla Municipality. The distribution of fruit trees has commenced, and during the year 871 trees of kinds were given away gratis to people residing within a radius of 20 miles from Simla, leaving a stock of 2,000 available for next year's distribution.

The Municipal report also contains an account of the Annandale garden which has been extracted in part only. The ordinary work of the garden has been similar to that of former years. The stock of saleable plants has been greatly increased both in number and variety though there was a falling-off in the quantity of fruit due to hail storms and the removal of trees for the extension of the race-course. Much improvement has been made by superior cultivation, by the erection of new buildings, and by the opening out of roads, and the stock has increased 10 fold in value. 4,862 plants have been put out about the station, 2,000 cuttings planted and 22 maunds of seed sown. The nurseries also received attention. The blue gum suffers much from snow, which I have also observed to be the case at Abbottabad, and this species cannot arrive at perfection at such altitudes.

No mention has been made of the gardens at Mooltan, Sialkot or Hazara.

(*d*).—NURSERIES.

The following statement contains the information available with regard to nurseries :—

Year.	Total area of land set apart for Nurseries.	Area stocked with plants at the beginning of each year.	Area sown or planted during each year.	Area on which cultivation has failed or from which plants will be removed.	Area stocked with trees or established plants at the end of each year.
	A. *R.* *P.*	*A.* *R.* *P.*	*A.* *R.* *P.*	*A.* *R.* *P.*	*A.* *R.* *P.*
1884-85 ...	1,633 3 18	101 1 39	10 0 39	1 3 9	109 3 29
1885-86 ...	1,967 2 16	109 3 29	1,456 0 24	83 3 2	1,482 1 11
1886-87 ...	2,031 2 30	1,482 1 11	73 1 5	19 1 1	1,536 1 15
Figures for the three years.	2,031 2 30	101 1 39	1,539 2 28	104 3 12	1,536 1 15

This is a most important branch of aboriculture and it is satisfactory to notice from the District reports that much greater attention has been paid to the necessity of maintaining a sufficient and suitable supply of young plants for all requirements and for distribution as opportunity may offer. I am glad to note that while in 1884 only 10 districts showed an area of 101 acres as stocked with plants, the returns for the past year show this to have been increased to 1,536 acres and that there are now only three districts in the whole Province which do not record nurseries of more or less extent. Indeed some Districts report the area stocked as sufficient for all requirements, but of this I am very doubtful, and if the area of 1,208 acres of the Tilauri plantation in the Delhi District, which should not appear as a nursery, be deducted from the area stocked at the end of 1886-87 it will be seen that there is only as yet the small area of 328 acres in the whole Province from which plants are available, which must still be considered as utterly inadequate.

Setting aside the area of 1,208 acres above-mentioned in the Delhi District, the operations of the three years comprised a net increase of 227 acres. The year 1885-86 showed the greatest activity; in 1886-87, 73 acres were added against 10 in 1884-85 and 18 in 1883-84.

In Muzaffargarh no new nurseries are being formed, the present area being said to be sufficient for all requirements.

The Mooltan District has small plots in gardens, no special areas for nurseries being set aside.

In Bannu mulberry and shisham trees are easily obtainable elsewhere, and the small nursery at Mowrang is chiefly used for exotics and experiments. Still the District Committee is fully alive to the importance of the matter and intend starting new ones. There has been a large extension in Hissar though the success is not very great. Ferozepore adds 7 new nurseries and reports that special attention has been given to this portion of the arboricultural operations. In Kohat there are 2 nurseries, but they are reported as insufficient and I should say rightly so.

Rohtak shows 7 nurseries, able to supply all requirements. In the Lahore District 4 new nurseries have been laid out in the Lahore tahsil, 5 in Kasur and 1 in Chunnian.

From 3 nurseries at Karnal 3,000 plants have been removed, but though no new sowings were effected, no change has been made in the area. It is explained that they still contain more than sufficient for the possible requirements of the District, and this may be true if operations are not carried out on a more extended scale than during the last few years.

In Jhelum a small addition was made. Material for the years work was obtained from the Pira-Ghaib nursery, and from the small preserves maintained along the sides of the roads. Choya Saidan Shah and Ponyra nurseries are in good condition.

Small nurseries have been laid out near roads in the Gujranwala District and are maintained by small payments to zamindars.

In Amritsar 4 new nurseries were established and a large number of fruit and timber tree seedlings put down of which however many died.

One nursery at Phillour in the Jullundur District was surrendered to Government, but another is to be formed in its place; one new one was established. From the existing nurseries 45,267 plants were supplied free of cost to the Executive Engineer, the Military Department and to zamindars.

Ludhiana contains 5 nurseries, sufficient to supply the District, but not conveniently situated. There has been no actual increase in the Rawalpindi District, the entry in the statement being on account of former errors.

Of 10 additional nurseries in the Gurdaspur District three failed for want of proper arrangements for watering. Hazara shows one nursery less, the small area at Sultanpur having been cleared as not required.

In Kangra 43 acres are already stocked, and at Dharmsala there are now large numbers of deodar, kail and chil. The Nurpur nursery contains Chinese mulberry, which is in demand for sericulture purposes.

Existing nurseries were maintained in the Dera Ghazi Khan District and in addition to furnishing material for District requirements supplied fruit trees free of cost to the zamindars.

With the exception of a slight addition to Police nurseries no change has been made in the Delhi District during the past year. The Tilauri plantation of 1,208 acres is still entered on the statement of nurseries in this District.

e.—Cattle Trespass and Lopping.

My experience leads me to the belief that sufficient stress is not laid on the importance of preventing cattle straying, especially along avenues. I firmly believe that in very many instances the failure of trees, I cannot say death, (because very often the trees recover sufficiently to live but not to thrive) is due to nothing but browsing. This point is remarked on by the Deputy Commissioner of Sialkot, and I am fully convinced that not only is far more attention in this respect required, but that, it would well repay the extra trouble.

Only one District notices the matter, and yet in every District there must be great damage year by year. No doubt in some Districts the evil is much alleviated by fencing and the erection of crates and mud or brick enclosures as in Gurdaspur, Jhelum and Gujranwala, but even these safeguards are generally insufficient to keep off goats and camels. It is difficult to devise means to effectually check this evil, and I can only recommend stricter supervision and heavy punishment coupled wherever possible, with such artificial measures as are practicable.

Lopping, it is observed, has received much greater attention during the last few years, and in many Districts it is now carried out under more or less responsible supervision. The extensive loppings in the Gujrat District were supervised by the Deputy Commissioner himself, but though this cannot of course be done in many cases, it is nevertheless imperative that whenever possible the work should be inspected. From Muzaffargarh we learn that lopping was done more extensively in 1886-87, but without any due supervision. In Kohat it is performed under the direct superintendence of the jamadar and head malis, and in Jhelum and Amritsar it has received attention and the old plan has been greatly improved on. In Delhi hand-saws are used. Karnal, however, reports that as a rule it is scarcely allowed except when absolutely necessary, and then it is done with great care and in accordance with Conservator's instructions.

Notwithstanding the improvements above noted, I am of the firm conviction that stricter supervision is still necessary in many Districts, and in order to maintain the required standard, the attention of District Officers and Local Boards must continue to be directed to this subject.

f.—Fodder Trees.

A fuller report on the subject of fodder trees having been called for in paragraph 5 of the review on the report for 1885-86, I propose to treat the matter under a separate heading, though the scanty remarks on the subject contained in the several District reports scarcely warrant this procedure.

A glance at the names of the trees in column 6 of Statements I, II and III, will show that many of the trees planted are fodder producing trees, but broadly speaking in no District is any special attention paid to the rearing of

trees destined chiefly to furnish fodder. It is generally admitted, and considered sufficient in most Districts, that many of them already abound with trees which in time of necessity can be used for the purpose of fodder, and consequently no special attempts in this direction have been made. In this category belong the Districts of Amritsar and Delhi. It will be observed that the Commissioner of Jullundur took action on the Government of India letter No. $\frac{1019}{148-2}$ of 5th December 1885, and called for special reports on this subject in January 1886. The present reports from this Division, however, treat the matter as of little moment. In the Jullundur District wells are considered to be sufficient to prevent famine, and therefore the special rearing of fodder trees is not called for in the opinion of the Deputy Commissioner. Worthy of note are, however, the endeavours to introduce the cultivation of the date palm in the Ferozepore District, and success in this direction will in addition tend to largely increase the food supply of the District.

From Peshawar and Hazara it is reported that fodder tress are not grown or planted, but with regard to the latter it is within my knowledge that a considerable stretch of road is planted with mulberry.

Kohat is a hilly District with good waste, and fodder trees are considered unnecessary. This statement, however, scarcely coincides with the further remark of the Deputy Commissioner, that the year 1886-87 being a most exceptional one, cattle suffered severely on lands dependent on rain, and it is obvious that had tree fodder under such circumstances been available, it would have greatly relieved the distress.

In the Rawalpindi District small attempts seem to have been made, and 700 trees of dhaman, khooa and kolia were planted out in the villages at the foot of the hills.

In Kangra it is said to be not necessary to consider this subject.

In this connection I would bring to notice the remarks made in the report of the Upper Sutlej Canal Division, which are of great interest, and clearly show how the rearing of fodder trees may at times be a source of considerable profit as well as of great benefit to the surrounding population.

g.—Financial.

The following statement shows the income and expenditure of the three years under report, which for purposes of comparison is given year by year:—

Year.	Income.	Expenditure.	Surplus.	Deficit.
	Rs.	Rs.	Rs.	Rs.
1884-85	31,863	1,05,043	...	73,180
1885-86	66,256	1,56,317	...	90,061
1886-87	94,755	1,75,159	...	80,404
Total ...	1,92,874	4,36,519	...	2,43,645

The report being a tri-ennial one it has been found possible to partially correct the printed statements for the year 1884-85 by addition of the figures for the Kangra and Ludhiana Districts which have now been supplied.

The figures for the year 1883-84 were—

		Rs.
Income		50,945
Expenditure		1,39,804
	Deficit ...	88,859

It will be seen therefore that during the year 1886-87, there has been a very considerable increase in revenue, the income of the year being Rs. 28,499 in excess of that for the previous year, and Rs. 43,810 above the figures for 1883-84. Notwithstanding this enlarged revenue the expenditure is fairly proportionate with that of previous years, being only Rs. 18,842 above that of 1885-86 and Rs. 35,355 in excess of that for 1883-84.

Of the Districts Gujrat shows the largest increase in revenue consequent on the extensive thinnings carried out in 1886-87.

The expenditure has increased over the figures for 1885-86 under almost every head, but chiefly under the afforestation of waste lands accounted for by purchase of some 169 acres of land in the villages of Guraora and Prithipura of the Gurgaon District, which however as the land pays revenue may have to be re-sold.

Comparing the figures of 1886-87 with those of 1883-84, we find a very considerable increase under Ornamental gardens chiefly on account of establishment but also in connection with the working charges. The charges for nursery establishments have nearly doubled themselves, while the expenditure on working has been considerably reduced. Other heads show little difference, though there has been a marked decrease in the cost of establishment on groves.

The deficit of the year 1886-87 compares favourably with those of previous years, and is less than that of 1885-86 and of 1883-84 by Rs. 9,657 and Rs. 8,455 respectively.

Ornamental gardens show a deficit of Rs. 38,975 in 1886-87 as against Rs. 37,521 and Rs. 12,760 in 1885-86 and 1883-84 respectively, and have not therefore as yet improved in their remunerativeness.

The transactions of the three years under report show a deficit of Rs. 2,43,645 and those of the last year Rs. 80,404.

C.—DEVELOPMENT OF ARBORICULTURE BY PRIVATE PERSONS.

This subject was dealt with at great length by the Committee which sat in April 1886, and the recommendations then put forward will no doubt greatly arouse activity in this respect and be the cause of a more lively interest being taken in the matter by the people generally. It is satisfactory to record that notwithstanding the unfavourableness of the past year, considerable progress appears to have been made in this branch of arboriculture. In the Rohtak District, if I understand the statement attached to the Rohtak report rightly, there are now small plantations, chiefly of kikar, in no less than 320 villages, 91 of which have been made without pecuniary aid, and the rest at the expense of Government. In many cases these plantations are most promising, and, though small, will soon become valuable. The result of the experiment has been most encouraging and efforts are being made to extend and repair the areas. Endeavours

are being made in the Karnal District to induce village communities and individuals to interest themselves more in planting, but so far the result has not been satisfactory.

It is to be regretted that the arrangements in the Hissar District to give up part of the old Customs line for cultivation, on condition that the rest should be sown with kikar, could not be carried out for want of rain. The plan seems a good one and should be persisted in, though at the same time it is within my recollection that a similar experiment years ago in the Gujranwala rakhs entirely failed. The scheme for taking up land for planting purposes in the Gurgaon District has proved successful, and 12 plots of uncultivated land aggregating 425 acres have been secured. The Committee bears the cost of planting while half the produce goes to the zamindars. 183 acres of the 425 have already been more or less successfully sown, while the rest has been partially sown or enclosed. In addition to the trees at present tried, I would recommend phullai, jhand, and *prosopis glandulosa*.

It is encouraging to learn from the report of this district that the example set by Government is beginning to take root, and that in 10 or 12 villages the people themselves are attempting conservancy; which, if continued, should lead to most satisfactory results. The system of rewards for private planting is said to have been more effective than anticipated, and I would advocate its adoption in other parts.

In the Amritsar District plants are given gratis from nurseries and gardens to the zamindars, who however take little interest in planting work. In Ludhiana nevertheless they appear to be glad to get fruit trees, and the Deputy Commissioner is cultivating the taste; and in Rawalpindi a large number of trees have been planted by zamindars at wells, tanks and musjids.

It is to be regretted that the scheme drawn up for the Delhi District by Mr. Maconachie in 1883-84 has not advanced, and that no plots have as yet been sown by the zamindars as contemplated.

II.—CANAL ARBORICULTURE.

Reports have this year been received from all Divisions, and give full detail of the arboricultural operations undertaken during the period under report. Some are, however, very discursive and could with advantage be much curtailed in future.

Previous to 1885-86 several Divisions showed the operations in avenues in acres, which renders a comparison of the figures for the years under report difficult.

The progress of the two years 1885—87 is as follows:—

	Length of single line planted during the year in feet.	Length of failures in feet.	Length stocked at end of year in feet.
1885-86	9,361,509	2,57,400	19,445,303
1886-87	9,82,721	7,94,744	19,633,280

There has thus been a considerable falling-off, but the figures compare favourably with those of the year 1883-84 in which 160,046 feet were planted with 44,480 feet failures. Of the failures during 1886-87, 571,160 feet are due to the correction of errors of previous years by which the actual length on which trees have died is reduced to 223,584 feet.

No statement of groves was submitted for 1883-84; during 1886-87 there has been a net increase in the area stocked of 428 acres, 3,219 acres having been planted during the year with 2,791 acres failures, as against 2,339 acres and 1,653 acres respectively in 1885-86.

Under nurseries 9 acres less were planted than in 1885-86. 44 acres of the 61 acres shown as failures during the year are consequent on corrections, which cause the area stocked at the end of 1886-87 to fall below that of 1885-86.

Spontaneous growth plays a great part on some of the canals, but chiefly in the Karnal District of the Western Jumna Canal, the Muzaffargarh Division, the Upper Sutlej and the Lower Sutlej and Chenab Inundation Canals, where planted avenues are rare, existing trees being mainly due to natural causes. In many instances operations are thus rendered comparatively easy, but where the conditions are not so favourable, as on the Sirhind Canal, it is not possible to depend on rainfall alone, but resource must be had to irrigation to ensure success.

In the Upper Sutlej Division the chief work consisted in planting and maintaining chouki compounds, and the extension of groves on the Lower Sohag and Para Canal. In the Hansi Division of the Western Jumna Canal, berm sowings of kikar did not succeed, though similar operations with shisham on the Swat River Canal and in the 3rd Division Sirhind Canal are well reported on and considered efficient and inexpensive. In the latter Division out of 3,03,176 feet of avenues added, no less than 2,86,150 feet were thus sown and are progressing favourably. This method is far less expensive than planting, and where possible it should, I think, be resorted to.

Gaps in existing avenues were filled in most Divisions; in the Delhi Division of the Western Jumna Canal, the 1st and 2nd Divisions of the Bari Doab Canal, the formation and improvement of plantations and gardens formed the main work. The incursion of the Indus causes considerable loss to established trees on the Indus Canal and increases the difficulty of future operations, planting having to be undertaken at a greater distance from the Canal.

The remarks of the Executive Engineer, Upper Sutlej Division, regarding the fodder furnished by the kikar trees lining the canal banks are interesting, and show how even canal avenues can be made to help in years of scarcity. From this source Rs. 2,632 were realized; the trees were not damaged and the zamindars were greatly benefited.

Damage by cattle grazing is complained of in the 2nd Division, Bari Doab Canal, where supervision is inefficient, and I would recommend the stoppage of grazing on the Lahore branch where natural reproduction is said to be possible until the existing gaps have been filled up.

The large length of failures in the 3rd Division Sirhind Canal during 1885-86 was consequent on the felling of 26,000 feet for construction of a telegraph line.

FINANCIAL.

The following table shows the financial results of canal arboriculture during the three years under report compared with those of 1883-84 :—

Year.	Income.	Expenditure.	Surplus.
	Rs.	Rs.	Rs.
1884-85 ...	74,978	45,903	29,075
1885-86 ...	83,077	53,026	30,051
1886-87 ...	57,404	56,486	918
Total ...	2,15,459	1,55,415	60,044
1883-84 ...	52,141	48,016	4,125

It will be seen that the last year has been very unfavourable in a financial point of view which has not been sufficiently explained in the Divisional reports.

The total income, while Rs. 5,263 in excess of that of 1883-84, is less than that of 1885-86 by Rs. 25,673. This large decrease is chiefly due to the non-existence of dead trees in the 2nd Division Bari Doab Canal and the 3rd Division Sirhind Canal, and to smaller sales of thinnings and loppings.

The total expenditure differs little from that of previous years, but is Rs. 8,460 and Rs 8,470 in excess of that of 1885-86 and 1883-84 respectively.

III.—ARBORICULTURE ON PROVINCIAL ROADS.

No notes or remarks on Provincial roads arboriculture have previously been submitted, and reports have now only been received from 5 out of the 11 Divisions.

From the statement of avenues attached it will be observed that while during the past year there has been an actual increase of 2,81,315 feet of single lines planted, the length fully stocked at the end of the year has, consequent on deductions on account of previous errors, omissions and transfers, decreased from 1,02,28,877 feet at the end of 1885-86 to 76,88,716 feet, but exceeds that at the end of 1883-84 by 6,51,616 feet.

In the absence of more detailed information I am unable to fully explain the deductions of the past year though some attempt has been made on the statement; they are, I believe, mostly due to certain transfers and changes which have taken place.

Statements of groves were not submitted previous to 1885-86. No actual addition has been made during 1886-87, the 26 acres shown as planted pertaining to some previous year.

In nurseries there has been an actual increase of 2½ acres during 1886-87, the 4 acres shown as planted in the statement being reduced by the deduction of areas previously stocked but omitted to be shown.

There has been a decrease in Income during 1886-87 of Rs. 1,379 as compared with 1885-86, partly due to the transfer of the Bannu Division to the District, and to fewer sales of dead trees from nurseries. Expenditure is also less by Rs. 4,893; there is an increase of Rs. 2,344 under establishments, and a decrease of Rs. 7,237 under working.

The deficit of the year is Rs. 3,177 as against Rs. 6,691 in the previous year.

I have &c.,

A. E. WILD,

Offg. Conservator Forests, Punjab.

I.—DISTRICT ARBORICULTURE.

DELHI DIVISION.

DELHI MUNICIPALITY.

Note by Officiating Secretary.

With reference to Deputy Commissioner's letter No. 197, dated 5th April last and subsequent reminders, I beg to state my inability to submit a report on arboriculture from the information before me. It is far too meagre even to attempt to do so. The total information consists of the following items :—

The total number of trees planted in 1885 was 540 for which 55 enclosures were erected. In 1886 trees 291, enclosures 1,138. In 1887 trees 1,658, enclosures 411. That there are three ornamental gardens, *viz* :—

	Income.			*Expenditure.*		
	Rs.	A.	P.	Rs.	A.	P.
Queen's garden	675	14	3	4,065	0	0
Roshnara	1,443	8	0	3,275	0	0
Kudsia	1,030	0	0	2,503	0	0

As for actual area planted or stocked or the number of nurseries and groves, &c., I have no information before me whatsoever. The statements are herewith returned.

I.—DELHI DISTRICT.

General remarks.—The rainfall during the year amounted to 31·83 inches and was in excess of the average rainfall by 5 inches. There were no other events specially affecting arboriculture.

Description of work.—Avenues.—Tree-planting is making very good progress on the following metalled roads :—

1. Humayun-Safdarjang Tombs road.
2. Delhi-Najafgarh road.
3. Suniput-Bahalgarh road.
4. Suniput-Murthal road.
5. Badurpur-Mehrauli road.

The total length of road No. 1 (2½ miles) is stocked with trees which have attained a height of between 5 and 20 feet and are in a flourishing condition. 150 jaman, shisham and other trees were planted in blank spaces on the road during the year under report at a cost of Rs. 12-8-0, and were provided with hedges for protection from cattle. They are doing well. The whole length of the Delhi-Najafgarh road is stocked with kikar trees, and the first seven miles of it, from its junction with the Rohtak road, with a second row of other species of trees. The trees are thriving and progressing favourably. 300 plants obtained from the nursery on the road were planted during the year under report in extension of the existing avenue. The young trees were covered with pula in the cold season for protection from frost at a cost of Rs. 8-6-0. Half of the Sunipat-Bahalgarh road (length five miles) is stocked with trees, but 5,000 of the young trees planted in previous years did not take root, owing to saline efflorescence in the soil, and dried up during this year. The young trees on the road were covered with pula in the cold season. The Suniput-Murthal road is stocked with kikar trees in a length of 3 miles and with a second row of trees of other species in about a mile. No additions were made to the avenues on the road during the year under report. Trees were planted during the year under report in about ¾th of a mile in extension of the 2 miles on the Badarpur-Tughlukabad road. 4,000 young trees are reported to have been destroyed by whitcants on this road during the year. There is a permanent establishment of malis, bhistis and chowkidars on all these roads, the charges of which during the year under report amounted to Rs. 1,512-13-1. The avenues are developing steadily and growing into fine shady avenues.

Avenues on kacha roads.—No water-carriers or malis are kept up on any of the other district roads which are unmetalled and hence no trees are planted on them. Kikar seed is, however, sown on their sides every year in the rainy season, this being a cheap mode of raising trees not requiring much care and labour. Kikar seeds were sown during the year under report on the following roads at a cost of Rs. 28-1-0 :—

1. Delhi-Paim Bari road.
2. Delhi-Basant road.
3. Delhi-Dabirpur road.

The seeds are reported to have germinated, but the saplings were destroyed by heavy rainfall. The seedlings raised on the various other kacha roads in previous years are in good condition. It is not possible to enter into details as the statements of arboricultural operations which have been prepared this year by the Local Boards differ considerably from the previous year's statements which were prepared by the Tahsildars, and it is not certain which of them are reliable. With a view to ensuring accuracy in the preparation of the returns, a register of arboricultural operations has been opened in this office, and forms containing the necessary headings have been sent to the Local Boards and members in charge of "bands," groves, &c., with orders to measure the length of avenues, and enumerate the trees on each road, &c., to fill in the forms carefully, and to return them to this office to be entered in the register.

Police buildings.—The following extract from a report furnished by the District Superintendent of Police, who is in charge of the arboricultural operations at Police Stations, rest-houses and road-posts, shows the progress made in tree-planting at these places during the year under report:—

"At the beginning of the year there were on Police lands 3,507 trees, and during the year 2,245 more were planted.

"Of these 470 have failed, leaving 5,282 trees now alive. Nim, siras, shisham and kikar have been principally planted, nim flourishes."

The cost of establishment was Rs. 268-2-3.

Irrigation bands.—Kikar seed was sown in the rainy season on the embankments and slopes of 16 irrigation bands.

A great number of the seedlings are established. Forms similar to those for roads referred to above have been sent to the members in charge of the bands, but have not been yet returned by them filled in. The trees are watched and weeded by the chowkidars kept up at the bands.

Plantations at tanks.—The arrangements made for taking up plots of land at Fattehpur, Assaula, Mehrauli, Guman-Hera, Dhindasa and Suredah for tree-planting were described in the Arboriculture Report for 1883-84. The land taken up at Fattehpur-Assaula was provided with an enclosure wall and a trench and trees were planted in it. The land taken up at Mehrauli was also similarly planted. The plantations at both these places are in good condition. No land has been given by the zamindars adjacent to the tank dug at Guman-Hera. The attempt to make plantations in the land taken up adjacent to the tanks dug at Dhindasa and Suredah has not been altogether successful. Seeds have been sown in both these plots every year in the rainy season; but owing to negligence on the part of the lambardars, and the want of irrigation, the seedlings are destroyed. Rs. 39-2-0 and Rs. 17-3-0 were expended in sowing shisham and kikar seeds at Suredah and Dhindasa respectively during the year under report. The operations were only partially successful. The question of improving the condition of these plantations is engaging attention, and it is hoped that good results will be achieved in a very few years.

Scheme for the encouragement of tree-planting by zamindars.—The scheme prepared by Mr. R. Maconachie for the encouragement of tree-planting by zamindars was described in the Arboriculture reports for 1882-83 and 1883-84. No plots have been sown by the zamindars as contemplated in this scheme.

Nurseries.—There are 18 nurseries in the district as shown in the statement. Nine new nurseries have been shown by the District Superintendent of Police in his statement for the first time. But they are not new, as the District Superintendent of Police states that the trees in many of them are large. Shiekargah-Pilaori is also not a nursery but a plantation. All the nurseries are well stocked with young trees and trees are taken from them for transplantation on roads especially from those situated on roads.

Lopping.—The branches of trees on the following roads were lopped during the year under report:—

		Cost. Rs.	A.	P.
1.	Palam-Basant road	24	13	6
2.	Chhaensa-Ballabgarh road	5	12	6
3.	Faridabad-Majahaoli road	3	2	0
4.	Delhi-Paimbari road	13	4	0

The trees were lopped with hand saws (*aris*) by malis in the cold season between December and March.

No special attempts have been made to grow fodder trees in any particular parts of the districts, but a considerable number of the trees growing on the roads and in the groves and plantations in this district are kikar, bor (Ficus Indicus), pipal (Ficus Religiosa), beri (Tizyphus Jujuba), mulberry and siris, the leaves and twigs of which are used as fodder for cattle.

Establishment.—The establishment employed during the year on the various roads, groves &c., consisted of malis, bhistis and chowkidars, and cost Rs. 1,726-13-11.

The arboriculture operations were under the charge of the Local Boards. The financial result was as follows :—

	Rs.	A.	P.
Income	678	4	6
Expenditure	2,100	4	8

2.—GURGAON DISTRICT.

General remarks.—Gurgaon has been fortunate in having a succession of Deputy Commissioners who have taken interest in making the roads of the District as green as possible. Mr. Oliver did a great deal; among other things, the fine avenue between the Civil Station and the Railway was started by him as well as the beautiful line of mellingtonias on the Najafgarh road. Mr. Roberts who succeeded him was quite as keen, if he was more economical, in the prosecution of arboriculture, and the results became yearly more manifest. Miles of the Sohna road became covered with shade, and in many other parts successful plantings were made. After Mr. Roberts came a rather weaker time, as Mr. Stogdon and Major Napier were not here long enough to undertake a steady policy. But the good results of former efforts were not lost, and when I came to the District in April 1885, I was delighted to see how much had been effected in an arid district by continuous and well applied energy. While acting here in 1883 for a short time, I had been able to give a new turn to arboriculture by initiating the conservancy of portions of the large hill areas, and this beginning has been carried on since. There are now several such areas under conservation and already exhibiting good results. The present state of the development of road avenues in the district is shown in the accompanying map* which explains itself.

Description of work.—The more important special work done in avenues since 1884 may be summarised as follows :—

1.	On the Gurgaon-Sohna road	5,000 trees.
2.	On the Gurgaon-Najafgarh road	550 „
3.	On the Gurgaon-Mahrauli road	600 „
4.	On the Gurgaon-Farukhnagar road	400 „
5.	On the Sohna-Palwal road	1,500 „
6.	On the Nuh-Ferozepore road	2,100 „
7.	On the Rewari-Jhajhar road	1,600 „
8.	On the Ferozepore-Alwar road	750 „
9.	On the Nuh-Rewari	500 „
	Total ...	13,000 trees.

This enumeration has been revised cutting off odd numbers, so that it may show a safe margin below the real outcome. It doubtless looks small, and does not of course represent any of the self-sown trees which are pretty numerous in parts.

The only plantation of grown trees that we have is one in the Civil Station of 22¼ acres. This is nearly full of young trees that in a few years will come on for thinning; they were pruned last year, and are growing all the faster in consequence.

Other plantation-grounds have been recently taken up for trees as shown in the following list :—

Class.	No.	Name of plantation.	Tahsil.	Extent in acres. A.	R.	P.
A.	1	Inayatpur	Gurgaon	78	2	0
	2	Farukhnagar	„	73	2	0
	3	Khurrampur	„	31	0	0
B.	4	Dharuhera	Rewari	63	0	0
	5	Maheseri	„	20	0	0
	6	Kutbpur	„	12	3	10
C.	7	Guraora	Rewari	23	3	25
	8	Chang	„	31	1	0
	9	Jiwara	„	7	2	0
	10	Chilhar	„	7	1	20
	11	Palla	„	38	0	0
	12	Nalhar	„	38	0	0

* *Note.*—Map not printed.

The terms in each case are the same, *viz.* that the expenditure in planting be undertaken by the committee and that half the produce goes to the zemindars. I have divided the plantations into three classes—in the first class the plots are enclosed and have been more or less successfully sown; in the second, enclosures have been formed, and partial sowing done; in the third, either the enclosure has not been yet formed, or after forming enclosure the sowing has been entirely unsuccessful. The land in each case is uncultivated ground

Inayatpur may be said now to be an all but certain success. Farukhnagar and Khurrampur in the order named will also probably be remunerative. The other places will require more attention; in fact, as in arboriculture operations generally, we have erred in attempting too much. Where I have been able to see after things frequently in person, there energy has been displayed: otherwise the work flags. But this is the old story. If after fair trial a plot proves too inferior, we must give the land up—it will be something at any rate to have it demonstrated that trees cannot grow; meanwhile we have ground enough to use all our energy in for several years. The trees we try to grow are shisham, nim, kikar, ber and farash.

The third branch of arboriculture is the conservancy of hill areas. There are two degrees of conservancy, (*a*) from feeding, (*b*) from cutting. The areas under strict conservancy with the dates on which conservancy began, are as follows:—

		A.	R.	P.		
1.	Sohna hill	312	2	0	...	1883
2.	Nathupur	271	0	0	...	1883
3.	Bhundsi	62	2	0	...	1885
4.	Khol	387	0	0	...	1885
5.	Tankri	258	0	0	...	1887
6.	Sohna (additional)	441	0	0	..	1887
	TOTAL ...	1,732	2	0		

(*b*) 1. Khol and surrounding villages, about 2,000 acres.

No doubt these operations are small, but they are real—the Sohna hill has thousands of young hill trees now. Bhundsi is nearly as good; Nathupur shows something; and Khol a great difference. It has been shown clearly that closing such areas against grazing is all that is necessary to raise trees, and what is more, it seems certain that 7 years will prove ample time to secure the trees, and that after that time grazing of goats, cows, sheep and oxen, will be safe. The preserved grounds are also conspicuous for the improvement in the grass which now has a good bottom.

One of the most cheering things connected with this 'forlorn hope' kind of work, in the force of example shown in the fact that the villagers in several parts seeing what we are doing, attempt themselves to enforce conservancy; this has happened in at least ten or twelve villages, and even such modified restrictions produce real improvement in the appearance of the hills. If we had our hands strengthened only so far as to prevent grazing in certain blocks, to be changed in turn, the successful working out of the whole area is perfectly certain. Meanwhile, I have quite enough encouragement to keep me going.

Rewards have during the last two years been given for private tree-planting operations by the zamindars, and my personal observation leads me to think that an impulse has been given to work in this direction, considerably more effective than I hoped for. Very many villages will now point out a tree or two, or several trees together, carefully fenced in and watered, called 'sirkari,' meaning of course grown at the suggestion of the District authorities, and the thing if persevered in will grow.

Expenditure.—Expenditure has been large, I am not afraid to say too large. We still need improvement in system; no easy matter, however, remembering the materials we have to work with. Local interests are very strong; the malis in some places think themselves entitled to wayside pensions, bhistis have an uncomfortable knack of hanging on under the auspicies of soft-hearted Tahsildars, and so on. One large item of expenditure needs notice. We have bought a large plot of land in the two villages of Guraora and Pirthipura, about 169 acres, at a very low rate. But here a new condition presents itself; the land pays revenue, and it seems doubtful whether under these circumstances we can afford to use it for trees. If this should on further examination prove to be the case, we shall have to re-sell the land.

Future plan of operations.—In conclusion I may sketch out the work of the next three years as at present intended. The scheme will be elaborated hereafter as a Working Plan of Arboriculture in Gurgaon.

Avenues.—Finish up work on the Station, Kutb and Sohna roads; Sohna-Palwal and Palwal-Hathin roads. Malis and bhistis should be taken away from these roads by November 1890.

Prosecute planting on the Najafgarh and Basai roads; the Rewari-Jhajjar and Rewari-Narnaul roads; the Nuh-Rewari and Sohna-Ferozepore roads; and fill up gaps in various other lines.

Plantations.—Maintain development of Class A, and plant selected plantations in classes B and C (selections not at present certain).

Hill areas.—Complete Sohna and Bhundsi conservancy and carry on the work on the other areas. We shall probably not do as much as we propose, but we shall, I trust, effect a good deal.

3.—ROHTAK DISTRICT.

General remarks.—The rainfall at each Tahsil during the years 1884-85, 1885-86, and 1886-87 was as follows :—

Tahsil.	Year.		
	1884-85.	1885-86.	1886-87.
Rohtak	24·3	40·0	20·1
Jhajjar	28·1	44·8	13·9
Sampla	28·9	31·9	17·2
Gohana	23·5	32·1	12·9
As shown in the Return ...	24·3	40·0	16·0

The rainfall of 1886-87, though not very small in amount, was badly distributed. The rains ceased early and were succeeded by hot winds. There was practically no winter rain. For the last ten months there has been no rain to speak of. This prolonged drought has led to intense dryness of the atmosphere, and has seriously hampered arboricultural operations. There was a severe storm in May 1886, which resulted in the partial or total destruction of many trees on different roads.

Description of work.—The principal work done during the past three years has been extending and keeping up avenues of trees, planting out plots of land in many villages with hardy trees, and enclosing portions of the Jhajjar *Birs* with a view to forming them into fuel and fodder preserves.

Avenues.—As regards avenues the following detail shows results of operations :—

Locality.	No. of trees planted.			No. of trees died.		
	1884-85.	1885-86.	1886-87.	1884-85.	1885-86.	1886-87.
Jhajjar-Kharkhanda road	1,020	488	2,000	91	28	90
Beri-Bahadurgurh ,, ...	854	288	100	43	20	10
Sampla-Beri ,, ...	720	210	51	50	7	2
Rohtak-Kharkhanda ,, ...	2,118	292	175	62	67	15
Jhajjar-Bahadurgurh ,, ...	249	722	470	65	23	5
Rohtak-Jhajjar ,, ...	110	365	80	427	25	90
Jhajjar-Jehazgurh ,, ...	289	50	...	...	...	...
Jhajjar-Dadri ,, ...	261	20	..	12	...	8
Jhajjar-Salawas ,, ...	90	645	..	2	...	...
Jhajjar-Rewari ,, ...	51	70	100	...	...	...
Jhajjar-Farrukhnagar ,, ...	305	30	...	...	...	...
Customs ,, ...	150	..	50	...	75	100
Rohtak-Gohana ,, ...	650	400	750	261	99	65
Gohana-Panipat ,, ...	250	104	95	250	20	10
Rohtak-Bhiwani ,, ...	358	35	180	19	286	30
Rohtak-Sundarpur ,, ...	85	155	80	103	11	30
Rohtak-Jhind ,, ...	332	12	...	...	18	...
Gohana-Butana ,, ...	220	635	170	34	83	34
Gohana-Hansi ,, ...	750	592	145	150	70	50
Gohana-Alabam ,, ...	550	100	493	350	75	117
Gohana-Kharkanda ,, ...	975	807	422	...	119	80
Rohtak-Beri ,, ...	...	...	450	...	...	100
Delhi-Sirsa ,, ...	...	...	378	...	...	35
Canal cut leading Rohtak Station road ..	108	...	...	296	...	...
Circular Road at Rohtak	378	450	80	...	106	80
Station Road, Rohtak	79	228	297	...	36	13
Total ...	10,902	6,609	6,401	2,215	1,163	909

The following is an abstract showing for each Tahsil the number of trees planted and of those that died :—

Tahsil.	No. of trees planted.			No. of trees died.		
	1884-85.	1885-86.	1886-87.	1884-85.	1885-86.	1886-87.
Rontak	2,668	1,345	1,930	762	570	308
Jhajjar	1,366	1,532	520	159	180	163
Sampla	3,878	1,408	2,311	260	53	107
Gohana	2,995	2,413	1,730	1,034	410	331
Total ...	10,902	6,698	6,491	2,215	1,163	909
Percentage of success ...	79	82	86	...	...	...

The trees planted were chiefly shisham, farash, nim, seras, pipal, mulberry, kikar, bakyan. Owing to the aridity of the district, the presence of kankar in the sub-soil in many places, abundance of white ants and numerous goat and cattle, tree-planting is a disheartening task in this district. Many if not most of the trees planted out are miserably stunted and deformed. Only where water is abundant, as in the neighbourhood of the canal, do trees attain a proper development.

Plantation of trees in villages.—In 1884, plots of land were planted in many villages with kikar, raunj and ber, principally kikar. The result was reported on in this office No. 568, dated 25th September 1884, a copy of the statement attached to that letter follows :—

1	2	3	4	5	6	7	8	9	10
Name of Tahsil.	Number of villages, roads, &c., on which trees have been planted.	Area planted out. In avenues.	Area planted out. In groves.	Name of proprietor of land.	No. of trees sown and planted out.	Description of trees sown and planted.	Expenditure incurred in plantation of trees.	Supervising agency.	Name of persons who afforded aid in the plantation of trees.
		Miles.	B. B. B.	*Trees planted out on Government land.*			Rs. A. P.		
Jhajjar.	34 roads ...	43½	181 5 0	Govt. property...	Sown	Kikar, barberi, ronj, shisham.	89 1 6	Road establishment will supervise trees.	
				Trees planted out on private lands by Zamindars at Government expense.					
	13 villages	1	22 0 0	7 Shamlat Deh—1 Govt. property 5 private lands.	Sown	Kikar, barber, ronj, nim and shisham.	200 0 0	By private arrangement.	Akbar Lambardar, Gurawar, Tota Brahmin, Jawahra, Alahi Buksh.
				Trees planted out without Government aid.					
	27 „	...	67 0 0	10 Shamlat Deh. 17 private lands.	...	Kiker ...	... ...	Ditto ...	Modh. Zulfkar Khan, Raja Kuliyan Singh, Ram Nath, Sheo Nath, Nowrang Singh, and 22 others.
				Trees planted out by Zamindars on private lands held in common.					
	62 „	...	156 18 13	Shamlat Deh ...	...	Kiker	... ...	Ditto ...	Karam Khan, Ghulam Nabi Khan, Kuriya and Ballu Lambardars & 12 others.

1	2	3	4	5	6	7	8			9	10
Name of Tahsil.	Number of villages, roads, &c., on which trees have been planted.	Area planted out. In avenues.	Area planted out. In groves.	Name of proprietor of land.	No. of trees sown and planted out.	Description of trees sown and planted.	Expenditure incurred in plantation of trees. Rs.	A.	P.	Supervising agency.	Names of persons who afforded aid in the plantation of trees.
		Miles.	B. B. B.	*Trees planted out on Government land.*							
Sampla.	8 roads ...	92	18 0 0	Govt. property...	2,183	Siras, shisham, kikar, nim and farash.	69	6	0	Road establishment.	Hans Ram Zaildar and 4 others.
				Trees planted out on private lands by Zamindars at Government expense.							
	114 villages.	...	337 16 15	Shamlat Deh ..	...	Kikar trees.	138	10	0	By private arrangement.	Laiq Ram, Lo Ram, Amin Lal, Hans Ram and 5 others.
				Trees planted out on Government land.							
Gohana.	16 roads ..	18	5 miles ..	Govt. property ..	2,450	Shisham, nim, anar, anjir, mango trees, farash, jamowa, peach trees, kikar	648	13	10	Road establishment.	Tirkha, son of Zaildar of Butana, Nanak, son of Ramdas Zaildar, Jiwan and 21 others.
				Trees planted out on private lands by Zamindars at Government expense.							
	61 villages	...	100 12 0	Shamlat Deh.	...	Kikar, farash, nim, jamowa, bar, amrud, lemon, and barberi.	130	2	0	By private arrangement.	
				Trees planted without Government aid.							
	2 „	10 biga	5 9 0	Dalmir Khan, & Raini.	200	Kikar, shisham, amrud, anar, aru and jaman.	10	0	0	Ditto. ...	Dalmir Khan and Hati Ram, Zaildars.
				Trees planted out on Government lands.							
Gohana.	17 roads..	24½	13 14 0	Govt. property...	528	Farash, nim, dhak, shisham and kikar.	...	...	...	By road establishment.	
				Trees planted out on private land by Zamindars at Government expense.							
	41 villages	...	66 9 6	Shamlat Deh ...	...	Nim, farash, shisham, kikar, sonjana barberi, pipal, siris, bar, gondni.	...	...	...	By private arrangement.	Haidar Lambardar, Dhuman Zaildar, Tota Ram, Zaildar Jawahira and 41 others.

Operations were most successful in Sampla, and best so in Rohtak. I was much struck during my cold weather tour with the result of this experiment. In some villages there are now most promising plantations of young kikar trees. Though small, these plantations will soon be valuable, and are capable of extension, and show that with attention some trees can be reared of a useful kind with little expense. I have directed efforts to be made during the coming monsoon, if the season is favorable, to extend these plantations and to renew those that have failed owing to natural causes or neglect.

Fuel and fodder preserves in Jhajjar Bir.—During 1884-85, parts of the Jhajjar Birs were enclosed with a ditch and bank with a view to being used as fuel and fodder preserves. This enclosure has had a good effect on the growth of grass, and probably has been favorable to the trees. During the last year a plan has been sanctioned for improving the Jhajjar Birs. I am afraid the results will hardly be worth the cost. Owing to the prolonged drought it has not been possible to do much this year, but nurseries are being laid

out, and arrangements have been made to plant out seed of hardy trees and also to put down grass in suitable spots this rainy season. This is a matter, however, pertaining rather to the next report. About 200 acres of the Chhuchakwas Bir were burnt this spring. The larger trees were little injured, but a stack of grass was consumed. For several years no grass has been cut and stacked in these Birs, but there is no demand for it, and the expenditure seems so much money thrown away. The grass is of poor quality, and except with starvation among their cattle in the fair, the zamindars will have nothing to say to it. I think this stacking grass will probably prove a costly failure.

Extension of arboriculture.—The subject of the extension of arboriculture has been for some time under the consideration of the District Board. It has been decided to grant rewards to persons who exert themselves in this cause, and, if possible, to take up some land which appears suitable in the Sampla and Rohtak Tahsils. The following plan of future operations has been decided on, but the prolonged drought of 1886-87 will render it difficult to act up to this plan this year :—

"That 3 miles of a road be planted yearly with trees in each Tahsil. Before the commencement of each official year, each Local Board will select the locality where the trees are to be planted during the year and send proposals to the District Board for sanction. When the proposals of the Local Boards are sanctioned by the District Board, the former will make their own arrangements for planting trees, taking into consideration that the expenditure for planting trees in the first year, and for their maintenance in next three years, will be as follows :—

First year.

Rs. 690 each Tahsil, as per detail given below :—

Pay of 2 malis	... ...	Rs. 120 per annum.
Do. of 8 bhistis	... ...	„ 480 per annum.
Miscellaneous charges (thawlas, &c.)	...	„ 90 per annum = Rs. 690.

Second year.

Rs. 600 each Tahsil, as per detail given below :—

Pay of malis	... ...	Rs. 120 per annum.
Do. of 8 bhistis	... ...	„ 480 per annum = Rs. 600.

Third year.

Rs. 300 each Tahsil, as follows :—

Pay of 1 mali	... ...	Rs. 60 per annum.
Do. of 4 bhistis	... ...	„ 240 per annum = Rs. 300.

Fourth year.

Rs. 300 for each Tahsil, as per detail given above."

Groves along main roads.—There are small plots of land along some of the main roads, originally planted as groves. In some of these, the trees have almost all died. Orders have issued for the repair of the trenches surrounding these plots and the planting of hardy trees during the coming rainy season.

Lopping and pruning.—The trees are lopped and pruned twice a year. No pruning or removal of branches from any tree is permitted except under the direct supervision of the jamadar and head malis who are well aware of the importance of avoiding measures which lead to the permanent disfigurement of trees. When the work is finished the branches cut are collected at a convenient place in each Tahsil, and sold by public auction by the Tahsildars, and the proceeds are credited to the District Fund.

Nurseries.—In this District there are seven nurseries for rearing trees, 2 at the Sadr, 2 at Jhajjar, 1 at Sampla, 1 at Bahadurgurh and 1 at Gohana. They are able to supply almost all the trees required for planting out.

Establishment and supervision.—The arboriculture establishment consisted of—

Jamadar @ Rs. 10 per mensem,
Head malis @ Rs. 6 and 7 per mensem,
Malis @ Rs. 5 each per mensem,
Pakhalis @ Rs. 6 each per mensem,

who are supervised by the District Fund Overseer and the Tahsildars. The following is the scale maintained during the three years in each Tahsil :—

Tahsils.	1884-85.			1885-86.			1886-87.		
	Jamadars.	Malis.	Pakhalis.	Jamadars.	Malis.	Pakhalis.	Jamadars.	Malis.	Pakhalis.
Rohtak	1	16	12	1	16	16	1	16	17
Jhajjar	1	9	16	1	9	11	1	9	14
Sampla	1	10	9	1	11	9	1	14	10
Gohana	1	10	6	1	8	7	1	8	7

The charges incurred from the District Fund for establishment and contingencies may be seen from the following table :—

	Establishment.	*Contingent.*	*Total.*
	Rs.	Rs.	Rs.
1884-85 ...	5,530 ...	515 ...	6,050
1885-86 ...	5,435 ...	145 ...	5,580
1886-87 ...	5,911 ...	221 ...	6,132

The increase in the cost of establishment in 1886-87, as compared with that in the previous year, is due principally to the appointment of extra bhistis and their employment for longer periods owing to the insufficient rain-fall of 1886-87.

Receipts.

Financial result.—	1884-85.	1885-86.	1886-87.
	Rs.	Rs.	Rs.
By sale of fruits ...	0 ...	24 ...	17
„ Lopping ...	0 ...	28 ...	12
„ Dead trees ...	91 ...	380 ...	1,129
	91	432	1,158
Expenditure.			
As per detail given above—			
Deficit ...	6,050 ...	5,580 ...	6,132
	5,959	5,148	4,974

The large increase in income in 1886-87 is due principally to the statement mentioned above.

4.—HISSAR DISTRICT.

General remarks.—The instructions received from the Conservator of Forests under cover of Commissioner's Circular, No. 42, dated 6th February 1886, have been carefully attended to in this district, and particular attention has been paid in planting such trees that the leaves thereof can be utilized as fodder for cattle, which is greatly needed in a dry district as this ; the trees planted were such as kikar, pipal, shisham, lisora and shahtoot &c.

During the years under report the seasons were generally unfavorable for arboriculture owing to the inadequate rainfall. The arrangement made by Colonel Grey that part of the old Customs' line should be given for cultivation on condition that the rest should be sown with kikar, could not be carried out from want of rain.

Altogether it may be said that arboriculture has not been a success in this district during the last three years : and I see no hope of any advance unless the efforts of the establishment are confined to certain limited areas: and not spread over many miles of road.

Description of work.—Avenues.—The subjoined statement shows the results of trees planted during the years under report :—

Year.	Length in feet.	Trees planted.	Trees died.
1884-85	4,50,737	6,600	350
1885-86	4,50,737	2,752	786
1886-87	5,02,094	6,477	4,430

The increase during 1886-87 against two previous years is due to the addition of the following roads, *viz* :—

Road Hansi to Gohana ...	...	10,560 feet.
„ „ to Karnal ...	...	5,280 „
„ „ to Barwala ...	...	5,280 „
„ „ to Kharar ...	...	10,560 „
„ „ to Tosham ...	...	10,560 „
Barwala Circular Road ...	...	1,500 „
Sirsa to Ellenabad ...	...	1,500 „
Johorar to Do. ...	...	4,000 „
Total	...	49,240 feet.

The detail of the current year's work is as follows :—

Brought forward from 1885-86	4,50,737
Planted during 1886-87	5,037
Omitted from 1885-86 Statement	49,240
Total ...	5,05,014
Deduct area on which trees did not grow ...	2,920
Total correct area ...	5,02,094

The rains stopped early in 1886-87, and two-thirds of the trees planted, died. It is in my opinion a waste of money to attempt the formation of avenues in this district, except at the head-quarters or at Tahsils. At other places there can be little or no supervision : and trees are planted out only to die. The only means of successfully growing trees in an arid district like Hissar, is by taking up land for nurseries—and devoting all the time and energies of the establishment to a comparatively small area.

Nurseries.—Four small nurseries with an aggregate area of 4 acres and 34 poles were by mistake omitted from last year's statement. The area of nurseries sown during 1886-87 was 30 acres 3 roods and 17 poles, but the result was not very successful as $\frac{1}{3}$ of the trees planted out died.

The area at end of 1886-87 is as follows :—

	A.	R.	P.
Area brought forward from 1885-86	22	2	21
Planted during 1886-87	30	3	17
Omitted from 1885-86	4	0	34
Total ...	57	2	32

The following statement shows the trees planted during the year's under report :—

Year.	Area in A. R. P.	Trees planted.	Trees died.
1884-85	14 2 11	2,100	450
1885-86	22 2 21	1,13,262	500
1886-87	57 2 32	11,755	3,876

Gardens and Groves.—The area under this head in the statement for 1884-85 was 52 acres 2 roods 15 poles, but it has increased by 3 roads, *i. e.* one road in Bhiwani and 1 road in Fatehabad as shown in the statement for 1885-86, making in all a total of 53 acres 2 roods 15 poles. The subjoined statement shows the number of trees planted, and of those which have died at the end of each year under report.

Year.	Area in A. R. P.	Trees planted.	Trees died.
1884-85	52 2 15	2,370	100
1885-86	53 1 15	4,297	785
1886-87	53 1 15	2,193	545

The increase of Rs. 665 in the year 1885-86 as compared with the preceding year was mainly due to the making of a new well in the Sirsa garden, and to extensive lopping in the Hissar gardens.

The decrease of Rs. 407 in the year 1886-87 is due to the transfer of the station gardens at Sirsa and Hissar to the Municipalities of these towns and to one of the Hissar gardens being given on contract.

Expenditure.—The following is the detail of expenditure :—

	Rs.
1884-85	4,694
1885-86	4,645
1886-87	2,583

The decrease in the year 1886-87 is due to the transfer of the gardens &c., as above explained, and reduction in establishment.

Income.—The detail of income realized during the three years under report is as follows :—

Particulars.	Total.	Grand total.
	Rs.	
Gardens	332	
Nurseries	16	
Avenues and Groves	46	
		394
Gardens	803	
Nurseries	27	
Avenues and Groves	229	
		1,059
Gardens	...	
Nurseries	34	
Avenues and Groves	618	
		652

5.—KARNAL DISTRICT.

General remarks.—Rainfall.—The following table will show that the years 1886-87 was very unfavourable as regards the rainfall, the total amount being very deficient as compared with that of the previous two years, and in two Tahsils with the average of the five years ending 1885-86 :—

Tahsil.	1886-87.	1885-86.	1884-85.	Average of past 5 years.
Karnal	29·9	30·4	44·8	28·5
Panipat	20·7	24·5	27·6	22·1
Kaithal	8·0	24·4	20·0	18·5

But considering the adverse nature of the year, it is satisfactory to be able to state that the consequences were not quite so bad as could have been expected. On the other hand, there has been a marked improvement over at least the previous two years—the percentage of loss during the year under report being only ·9 as against 11· and 7· in 1884-85 and 1885-86 respectively.

There has, however, been a little decrease in the total number of trees.

There are now altogether 29,193 trees in this District. In the previous year there were 29,839, and in the year preceding that the number was 33,471.

Description of work.—The following statement will show the results of the past year in comparison with those of the previous two years :—

Statement showing the Arboriculture operations of the past three years.

1	2	3	4	5	6
Tahsil	Sub-heads of Arboriculture	Total number of trees at the beginning of the year 1884-85.	Total number of trees at the beginning of the year 1885 86.	Total number of trees at the beginning of the year 1886-87.	Total number of trees at the end of the year 1886-87.
KARNAL.	Avenues	14,154	13,848	13,720	13,614
	Groves	1,477	1,455	1,455	1,455
	Nurseries	4,308	2,405	2,214	1,674
	Total ...	19,939	17,708	17,389	16,743
PANIPAT.	Avenues	7,072	7,072	6,472	6,472
	Groves	203	203	203	203
	Nurseries	4,000	4,000	1,500	1,500
	Total ...	11,275	11,275	8,175	8,175
KAITHAL.	Avenues	2,618	2,609	2,606	2,206
	Groves	184	184	184	184
	Nurseries	1,865	1,635	1,485	1,485
	Total ...	4,667	4,428	4,275	4,275
	GRAND TOTAL ...	35,881	33,471	29,839	29,193

Cause of improvement.—The reason of these so far satisfactory results is that no new works were undertaken on account of the rather unsatisfactory state of the arboricultural operations in this District, but a greater care and attention devoted to the maintenance and protection of trees already planted.

Avenues.—The avenues in this District are mostly *shisham, sirus* and *jamoa* (*kikar* excepted). They are, when young, properly fenced by mud wall or wicker crates.

Lopping.—Lopping, as a rule, is scarcely allowed at all except where it is absolutely necessary (*e. g.* in the case of pendant branches) or otherwise distinctly advantageous.

But when done, it is done with great care, and, so far as can be, in accordance with suggestions of the Conservator of Forests. A dozen handsaws were procured from Calcutta for pruning, and the use of any other instrument is forbidden by standing order; but it is not quite easy to get trained hands in a backward district like Karnal, where "lopping"—(though the people here know nothing short of *mutilating*)—is considered only as means "for preventing the tree from getting large and thus becoming subject to the influence of strong winds."

Introduction of improved system of planting.—An improved system is being pursued for planting on pre-arranged lines from fixed centres; and in places where the soil is unfavourable to roadside avenues, groves will be formed as suggested by the Commissioner. Arrangements have been made to get some kikar trees planted during the current year.

Detail of avennes.—At present there are avenues along 22 roads in this District containing in all 22,692 trees as under:—

Tahsil	Karnal	... 13,614
Do.	Paniput	... 6,472
Do.	Kaithal	... 2,606

These trees, in all cases, are planted in single rows, and generally 22 to 25 foot apart; (on some roads, however, where, for instance, the trees are more shady, the distance is kept even up to 40 feet).

The following is a detailed account of each road enumerated in statement of Avenues:—

Karnal and Kaithal road.—There are altogether 3,198 trees on the 7 miles of this road planted out, of which 2,585 trees are on the portion lying in the Karnal Tahsil, and 613 on that lying in Kaithal (proceeding in each case from the Tahsil head-quarters).

These trees are planted 22 feet apart. They are in a fair condition, but the work is carried on under some difficulties as the water is at a great distance in that part of the district and the soil generally *reh* and *kallar*.

801 trees died on this road during the past three years, of which 605 have been replanted, leaving 196 blanks still existing. Of these 605, 150 blanks were filled up during the year 1886-87, while the loss in that year was only 50.

1,525 trees are receiving maintenance on this road; the rest are all grown up.

Karnal and Mirat road.—Two miles of this road are planted with trees. They are generally 25 feet apart, being in all 1,104, and they are for the most part in a fair condition.

These trees have now all reached maturity, and there was no loss during the year under report.

Karnal and Saharunpur road.—There are 640 trees on this road planted over a length of 2 miles. They are all grown up trees requiring no maintenance. The soil is similar to that of the Mirat road just referred to (*i.e.* generally good), both of them lying along the course of the Jumna.

Karnal and Hansi road.—1,471 trees are planted over 4¼ miles of this road, which is 18¾ miles long (in this District). More than half of these trees are full grown, and the plants are generally thriving on a favorable soil.

512 blanks were filled up during the past three years, while the loss was only 429. During the year under report 40 trees died, and 100 replanted.

The number of trees maintained during the year was 780.

Karnal and Jagadhari road.—17 miles of this road lie within the District, of which 5¼ miles are planted. All the trees, 1.625, have now reached maturity, and require no maintenance. They are generally 30 feet apart.

135 blanks (of previous years) are still left unfilled on this road, and will be attended to in due course.

Karnal and Ferozepore road.—Of the total length (21 miles) of this road, two miles only are planted with trees. They are 22 feet apart, numbering in all 1,111.

370 trees died during the past three years, and 347 replanted. During the year 1886-87, the number of blanks filled up was 80, and the number of trees died, 75.

About ⅔ of the total number are grown-up trees, and the remaining ⅓ receiving maintenance. The plants are in a thriving condition and will fenced.

Indri and Thanesar road.—The trees on this road are all grown up and form a good shady avenue. They are 620 in number.

Circular road, Karnal.—The whole of this road (¾ miles) is planted out. There were 893 trees on this road in the beginning of 1884-85, of which 386 were subsequently cut down because they were so contiguous to the town walls as to afford facilities for thieves &c., to enter the city by means of scaling.

Now there are 507 trees on this road, of which 90 are receiving maintenance. These are in a very satisfactory condition, and 21 feet apart.

Station roads.—These roads contain 3,331 tress planted over a total length of 6¾ miles (out of 7½ miles), being 22 feet apart. Of these, 1,382 trees are receiving maintenance, the rest being full grown. They are mostly *shisham* tress.

753 trees died during the past three years, (95 being in the year 1886-87), and were all replanted. In addition thereto, 152 more blanks existing from the previous years were filled up: 115 during the year 1886-87, and 37 during the previous year. These trees are all now in a very satisfactory condition.

Grand Trunk road.—620 trees stand over the total length (½ miles) lying within the Civil Station limits. Of these 200 received maintenance in the year 1884-85; but now they have all reached maturity. They are generally 25 feet apart.

Panipat and Sanauli road.—6 miles of this road are planted with 2,289 trees, of which 625 are receiving maintenance. These are now in a fair condition, there being no loss during the year 1886-87.

There were 2,589 trees on this road at the beginning of 1884-85.

Panipat and Barsat road.—Half a mile of this road is planted with 146 trees, which being full grown require no maintenance.

Panipat and Rohtak road.—Half a mile of this road is planted out with trees. These are altogether 200, and are all grown up, requiring no maintenance.

Panipat-Kothi towards River escape.—This road is completely planted out with 952 *shisham* and mulberry trees, which no longer require maintenance having nearly reached maturity. They are generally 20 feet apart.

Panipat tahsil building to the town.—There are 120 trees on this road which is completely planted out. They do not require maintenance.

Chhajpur and Seva road.—This road was completely planted out in 1882-83. At the beginning the experiment seemed to fail chiefly owing to excessive rains in that year, but now they are all in a very thriving condition—numbering 2,042 in all.

There was no loss during the year 1886-87—they are all being carefully maintained.

Road branching from Grand Trunk road to Kothi-Panipat.—The whole length of this road (1¼ miles) is planted out with mostly *shisham* trees—723 in all.

406 trees were maintained during the past year, and they all now appear to be in a very fair condition. There was no loss during the year 1886-87.

Kaithal and Jhindh road.—There are 1,227 trees on the three miles of this road (28½ miles long) planted out. No loss occurred during the year 1886-87; but 285 trees were lost during the previous two years which were all re-planted.

All these trees continue to be in a fair condition and well attended to—910 still receiving maintenance every year.

Rajanand and Asandh road.—There are 401 trees on the portion planted out. They are all receiving maintenance and making a statisfactory progress. No trees were lost during the past year, but there occurred 35 blanks during the year previous, which were duly filled up.

Kaithal and Pehowa road.—Only ¼ mile of this road is planted out. There are 303 trees thereon, of which 175 are receiving maintenance. They are all thriving satisfactorily, and will, it is hoped, reach maturity in a short time.

Kaithal and Thanesar road.—There are only 62 trees on the ¼ mile of this road planted out. They are all full grown; but the avenue is not quite shady—the intervening distances being very great.

Groves.—There are altogether 12 groves in this District, of which 8 (containing 1,455 trees) are in the Karnal tahsil, 2 (containing 203 trees) in Panipat, and 2 (containing 184) in Kaithal.

Number.

Description.—These groves contain in all 1,842 trees (as in the previous year) of various kinds, all in a satisfactory condition. Many of these trees are very large and present a good shade. They are all full grown trees and no longer require any maintenance.

Situation.—All the groves in the Karnal tahsil are along the Grand Trunk road. They are at three different places, *viz*:—

1. Gharaunda,
2. Karnal,
3. Butana,

which are ten miles distant from each other.

The groves in the Panipat tahsil are also along the Grand Trunk road. They are at the two encamping-grounds in that tahsil, namely, Sambalka and Panipat.

The Kaithal groves are one along the Bidkidar Tank channel, and the other at the Pundri rest-house.

Nurseries.—There are three nurseries in this District, *viz*: one at the head-quarter of each tahsil. Over 3,000 plants were removed during the past three years from these nurseries (540 in 1886-87) for transplanting on road-sides, and there are at present 4,185 more seedlings fit for transplanting, besides 174 big trees, and about 200 fruit and 100 flower trees.

No seed was sown in the place of plants taken out from these nurseries, as the existing number of seedlings is more than sufficient for the possible requirements of the District for some time to come. But in future the stock of plants will, it is hoped, be replenished in due course, as the system of arboriculture operations in this District is brought to a perfection.

General account of nurseries.—The nursery at Karnal contains 1,200 seedlings (beside 174 big trees), 200 fruit and 100 flower trees. The fruit trees are chiefly mangoes, peaches, Indian figs, lime, oranges, pears, pomegranates &c. It has supplied 2,634 seedlings for planting out during the past three years, of which 540 were during the year 1886-87, 251 in 1885-86 and 1,843 in 1884-85.

The Panipat nursery contains 1,500 seedlings.

The nursery at Kaithal contains 1,485 plants, and has supplied 380 for transplanting during the previous two years (*viz.* 150 in 1885-86 and 230 in 1884-85).

Seed.—The vegetable and flower seeds are supplied by the Agri-Horticultural gardens Committee at Lahore, to which the District Board pays a yearly contribution of Rs. 120,

but for future, I think it may perhaps be better, in some respects, to obtain the supply for this District from Saharanpur.

Income and Expenditure.—There is little income to be expected, as the trees are nearly all of them (excepting a small number in the Karnal nursery) ornamental, and intended to furnish shade along the roads. There are no timber plantations in the District, and no lopping is allowed off the road-side or other trees, as stated above. The only legitimate income therefore, besides that derived from the sale of fruit, is from trees blown down by the wind and the like.

The subjoined table of the financial results will show that the income of the year 1886-87 does not differ much from that of the year preceding it (*i. e.* Rs. 75-8 as against Rs. 80,) but it has fallen by more than Rs. 50 as compared with the figures of the year 1884-85.

Receipts.		*Charges.*	
	Rs.		Rs.
1886-87	75	1886-87	3,285
1885 86	80	1885-86	4,269
1884-85	127	1884-85	4,857

The difference lies in the reciepts from "fruit trees," and hardly calls for any explanation beyond that, that it was simply accidental.

Efforts are, however, being made to reduce the charges within the narrowest limits, so far, of course, as is compatible with the due development and protection of arboriculture in this District.

Cause of decrease in expenditure.—The expenditure has kept steadily decreasing during the last four years. In 1883-84 the total amount was so great as Rs. 5,728-14-7, but it has now come down to Rs. 3,285-0-11 (*i e.* only a little more than half). In other words the year 1886-87 shows a saving in the total amount of outlay by about Rs. 2,000 as compared with the average of the preceding five years, and by about Rs. 1,000 as compared with the item for 1885-86.

This remarkable fall in expenditure is so far satisfactory when it is considered that the state of arboriculture operations in this District has not at all suffered thereby; but has, on the other hand, been improving so far as the maintenance and protection of the existing plantations are concerned.

Protection of trees, &c.—The members of the Local Boards in this District are required to arrange for protection of trees within their beats (*i. e.* extending for five *kos* on each side of the village residence of the member), and the responsibility of Zaildars and Lambardars is from time to time enforced. The Tahsildars and members have further been enjoined by the Deputy Commissioner (who is *ex-officio* President of the District Board) for future, to draw up and submit plans for bringing rain water along the side-drains and bare spaces by District roads, so soon as rain falls and sowing belts of kikar trees.

By this process it is hoped to bring about a perfect arrangement for maintenance and protection of trees already planted, and even to set in new trees, chiefly of kikar, where possible, without incurring at the same time, the enormous charges of bhistis' pay &c.

Municipal Committee.—Hitherto the Municipal Committees in this District have done very little towards the development of arboriculture.

The Panipat Municipal Committee (the largest in this District, with an income of about Rs. 23,000) does not spend at all under this head.

The Karnal Municipality (income Rs. 22,000) spends Rs. 200 a year. There are altogether 500 trees within the Municipal limits (originally planted by the District Board) of which 90 are receiving maintenance. These have already been dealt with above under the head Avenues—the Karnal Circular road.

The Kaithal Municipal Budget expenditure under this head is Rs. 150, and its annual income about Rs. 14,000.

But to do these Municipalities justice, it may at the same time be mentioned, that the scene of the work of these Municipalities is not so large as to admit of any considerable amount of operations, although no doubt they (especially the Panipat Municipality) could do more in this direction if they choose.

Arboriculture by village committees and individuals.—There are some groves here and there in certain villages, but on the whole private enterprise is very little to be expected in a backward District like Karnal. Endeavours are being made to impress on the individuals as well as the village committees the desirability of planting groves and the value of trees for fodder purposes; but no practical results have yet been produced.

The circumstances (including those relating to Government lands) were explained in Deputy Commissioner's letter No. 221, dated 11th August 1886, to address of Commissioner

and Superintendent, Delhi Division. But due attention will, of course, be devoted to introduce the Hissar system, and get trees sown on uncultivated lands in this District.

The next detailed report on arboriculture will, it is hoped, contain more useful information on this subject.

Note by Deputy Commissioner.

I hope during the current year to take up the matter of tree-planting, which is much in need of the Deputy Commissioner's personal attention, in this District.

But it is difficult to pay attention to such important operations until a duly paid Secretary is available to relieve the Deputy Commissioner of the mass of routine work in connection with Local Funds which at present falls on him.

6.—UMBALLA DISTRICT.

General remarks.—The average rainfall of the past three years is as follows :—

1884-85	...	...	48.4
1885-86	...	...	36.0
1886-86	...	...	38.4

There has been no peculiar event during the period affecting arboriculture.

Description of work.—The total length of roads in the district at the beginning of 1884-85 was 491½ miles, and at the end of 1886-87 it was 525½ miles. The difference is due to transfer of Shabad and Jagadhri road from Provincial Public Works Department to District Board. At the beginning of 1884-85, the length of single lines stocked with trees or established plants was 11,25,684 feet, and at the end of 1886-87, the length of single lines stocked with the trees was 12,93,331 feet, or a difference of 1,67,647 feet, of which 1,26,700 feet is on account of addition of avenues on Shahabad and Jagadhri road ; 31,210 feet is on account of miscalculation in the statements prior to 1884-85, and the balance 9,737 feet is the progress made during the past three years on Mustafabad Railway Station road.

	No. of trees planted.	*No. of trees died &c.,*	*Road feet covered by new established trees.*
1884-85 ...	...	...	...
1885-86 ...	838	45	9,497
1886-87 ...	45	25	240
Total	883	70	9,737

12,169 trees were planted to fill up blanks on roads. Thus the total number of trees planted was 13,052, of this 2,233 failed. The percentage of successful trees is 82·3. 2,954 matured trees of avenues have died during the past three years.

At the beginning of 1884-85, there was no land under nurseries, but in 1886-87 an area of 11 rood 15 poles was set apart for this purpose, of which 9 roods 39 poles were brought under cultivation ; the species of trees planted thereon are, shisham, siris, tun, nim, tut, pilkhan, jamaun and pipal. The plants on the area of 9 roods 39 poles are available for transplantation.

Income.—The income under the different minor heads for the last three years was as follows :—

	Ornamental garden.	*Nurseries.*	*Avenues and groves.*	*Total.*
	Rs.		Rs.	Rs.
1884-85 ...	...	...	1,699	1,699
1885-86 ...	9	...	1,451	1,460
1886-87 ...	117	...	3,369	3,486
Total Rs. ...	126	...	6,519	6,645

Expenditure.—The expenditure under the corresponding heads for the last three years is as detailed below :—

	Ornamental garden.	*Nurseries.*	*Avenues and groves*	*Total.*
	Rs.		Rs.	Rs.
1884-85 ...	1,260	...	2,043	3,303
1885-86 ...	761	...	2,163	2,924
1886-87 ...	1,142	...	2,299	3,441
Total Rs. ...	3,163	...	6,505	9,668

Financial results.—The financial result of the Station garden is very poor. Great attention is being paid to make the garden a self-supporting one if not a source of income to the District Fund, but for want of sufficient water for irrigating purposes, this result cannot be obtained.

The income and expenditure under head avenue are about equal, but it is hoped that under the supervision of a paid Secretary to District Board, the income will rise.

SIMLA DISTRICT.

Arboriculture operations in this District are so small that no report can be prepared regarding them.

Extract from the Annual Report of the Simla Municipality, 1886-87.

Orchards.—The work performed during the past year has been of the usual nature and includes—

(1) Maintenance.
(2) Small extensions.
(3) Propagation, sale and distribution of fruit trees.
(4) Vegetable culture.

The number of permanent trees has been increased from 5,453 to 5,800, and the area from 50 to 52 acres.

The site called Cherot proving too cold for the pear tress planted on it, they were removed last winter to warmer positions, the reduced area caused by their removal having been allowed for in computing the area.

The site will, however, be retained for indigenous trees or small fruits for which its position is suited.

The trees were somewhat damaged and their growth checked by hail in April 1886, but the general growth is satisfactory.

Three statements are submitted, showing—

(1) The number of trees planted in permanent places to the end of March 1887.
(2) Details of nursery stock at the same date.
(3) Details of fruit trees distributed.

The distribution of fruit trees, which forms part of the Orchard scheme, was commenced during the past season. In all, 55 applicants appeared and the names of the principal recipients are given in the statement submitted.

The majority of the trees have been given to people residing within a radius of 20 miles of Simla.

The propagation of these trees has hitherto depended a good deal upon the Superintendent, but the head men at Annandale and Mahasu are now capable of grafting and budding, and others will be afforded opportunities for learning. One of the difficulties regarding this is, that so few native malis are able to read and write, and cannot therefore number or name the trees they cultivate.

The probable stock for next winter's distribution, replacing failures, &c., is upward of Rs. 2,000.

A report regarding potatoe cultivation is subjoined.

The receipts by sale of produce were—

Fruit trees ...	Rs.	120	4	0
Potatoes	„	82	7	0
Other vegetables ...	„	94	2	6
Total Rupees ...		296	13	6

The further extension of vegetable culture has been under consideration, but without some initial outlay in the preparation of the ground, collection of manure, and, above all, storage of water, there is no prospect of a continuous supply of vegetables being maintained.

The extension of the cultivation of lucerne, rhubarb, seakale and asparagus is desirable, and certain to be remunerative.

The expenditure during the year was—

Share of Superintendent's salary ...	Rs.	1,500	0	0
Native establishment	„	1,921	6	9
Contingencies	„	360	14	9
Completing rest-house verandah ...	„	217	1	0
Total Rupees ...		3,999	6	6

The Expenditure and Receipts from the commencement of the scheme to 31st March last is as follows :—

Total expenditure	Rs.	16,341	8	0
Receipts.				
Government of India grant ...	Rs.	5,000	0	0
Produce 1884-85 ...	„	131	8	9
Do. 1885-86 ...	„	162	4	9
Refund 1885-86 ...	„	268	1	0
Grant 1885-86 ...	„	1,500	0	0
Do. 1886-87 ...	„	1,500	0	0
Produce 1886-87 ...	„	296	13	6
Total Rupees ...		8,858	12	0

Leaving the net cost to the Municipal Committee, without interest, Rs. 7,402-12-0.

Statement showing number and varieties of Fruit trees planted in permanent places to end of March 1887.

	Apples.	Pears.	Peaches.	Apricots.	English Plums.	English Cherries.	Figs.	Various small fruits.	Totals.
Saungri	426	165	208	100	83	63	...	...	1,045
Chowri	56	45	...	20	12	73	...	30	236
Chowki	112	25	1,581	70	59	25	112	16	2,000
Cherot	...	...	...	...	...	...	...	35	35
Palang	522	534	...	390	...	...	...	4	1,446
Sogh	260	...	...	...	...	...	...	...	260
Kamali	...	...	106	...	...	...	...	...	106
Garaich .. ... —	162	131	...	215	...	...	60	...	568
Road sides	...	...	...	...	...	...	...	100	100
Total ...	1,538	900	1,895	795	154	161	172	185	5,800

Surplus stock of Fruit trees and Fruit tree stocks in Nurseries on 31*st March* 1887.

Grafts or Varieties not requiring Grafting.				Stocks for Grafting.			
Varieties.	Catchment Area.	Annandale.	Total.	Varieties.	Catchment Area.	Annandale.	Total.
Grafted Apples ...	646	578	1,224	Apple	1,071	780	1,851
„ Pears ...	...	121	121				
„ Peaches ...	26	...	26	Pear	156	1,200	1,356
„ Apricots ...	41	25	66				
„ Cherries ...	128	390	518	Plum	154	165	319
„ Plums ...	...	30	30				
Kashmir Quinces ...	150	...	150	Cherry	410	226	636
Figs ...	43	177	220	Almond	...	455	455
Total ...	1,034	1,321	2,355	Total ...	1,791	2,826	4,617

Fruit trees distributed gratis during 1886-87.

Names.	No. of trees.	Names.	No. of trees.	
Kaku	12	Brought forward	409	
Kishendutt	12	Nahin Singh	24	
Lalkoo	12	Ditoo	28	
Mandrai	20	Sahib Singh	30	
Rana of Bussahir	75	Ranbir Singh	26	
Jhoper	12	Bhaghat Rana	85	
tma	12	Lutf Hossain	25	No. of Applicants 55.
Maniah	12	Sharfudin	30	
Oodab Singh	12	Rifle Range	...	
uchiram	12	Sanjoli	16	
Thakuria 1	16	Col. Crookshank	23	
Lachmi Singh	15	Thakuria mason	20	
Kishen Lall	45	30 other applicants receiving each less than 12 trees in all.	155	
yed Abdulla	50			
Dabee Ram	92			
Carried forward	409	Total ...	871	

Abstract.

Apples	667	Figs	18		
Apricots	55	Pears	31		
Peaches	14	Almonds	14		
Cherries	69	Plums	3		
	805			66 =	871

Station Tree-planting, 1886-87.—A statement is below submitted showing :—

I.—The number of trees and shrubs planted about the station.

II.—Varieties and weight of seed sown in the station and in the nurseries.

III.—Varieties and numbers of stock in the nurseries.

IV.—A list of newly introduced shrubs, and coniferous trees.

In the station 4,862 plants of all descriptions were put down ; 2,000 cuttings planted and 22 maunds of seeds sown.

In the nurseries 12 maunds of seeds were sown, failures and removals replaced, and one year old seedlings transplanted.

The stock now in the nurseries, which has been counted, is 18,050, but, with the exception of the horse-chestnuts, none of the plants raised from last winter's sowings have been calculated. A very large quantity of seed has, however, germinated well and the plants are progressing.

In addition to the work, in and about Simla, 35 maunds of acorns of *Quercus dilatata* were sown on the Catchment Area at a cost of Rs. 70, which has been debited to the station grant.

Of the newly introduced trees and shrubs 22 species were raised from seed received from the Lawson Seed and Nursery Company, Edinburgh, 6 species from Lahore and 1 from Abbottabad.

The Establishment was employed as follows :—

Planting and sowing in the station and nurseries.

Maintenance of trees already planted.

Extending nursery plots.

Collecting and cleaning seed.

The results so far in the station are, that where the plants are protected they are doing well, of which the Ripon Hospital grounds are a fair example.

A large number of uncultivated shrubs have been planted in the Combermere Ravine, with a view to getting it covered with any thing which will hold the soil together and prevent erosion and landslips.

The plants are doing better here than in the more public parts of the station.

The Blue Gums planted near the Secretariat Offices suffer somewhat from the snow; but have been planted thickly and will support each other when larger. These are doing well, and the same may be said of the cuttings and trees planted near the new Katchary.

The expenditure during the year amounted to Rs. 991-10-6.

List of trees and shrubs planted about the Station during the year 1886-87.

Trees.		
Populus Ciliatæ	600	
Eucalyptus Globulus	282	
Cedrus Deodara	60	
Robinia Pseudo-accacia	50	
Various other species of trees	30	
		1,022
Shrubs.		
Broom, Yellow	220	
Do. White	200	
Furze	90	
Spiræa Lindleyana	100	
Wild Indigo	126	
Uncultivated varieties removed from the Forests	1,584	
Trees and Shrubs and other perennial plants, Ripon Hospital ...	1,040	
Dahlias	500	
		3,840
Trees given away.		
To United Service Club, deodars	100	
„ New Viceregal grounds „	100	
„ Native gentlemen „	22	
„ „ „ horse-chestnuts...	10	232
Poplar and Willow cuttings	...	2,000

List of Seeds sown.

Station.	Weight in seers.	Total.
Quercus dilatata	800	
„ incana	64	
Horse-Chestnuts	15	
Deodar	11	
Other varieties	18	
		908
Nurseries.		
Quercus dilatata	68	
Deodar	82	
Abies Webbiana	12	
Quercus incana	120	
Wild Cherry	23	
Other varieties	29	
Horse-Chestnuts	172	506
Total ...	...	1,414
1,414 seers = 35 maunds 14 seers		
Walnuts not weighed.	No.	
Number of nuts	4,800	

Nursery Stock.

In the open ground.		No.	No.
Deodars	transplanted	6,000	
Quercus incana	„	1,300	
„ Semicarpifolio	„	23	
Rhododendron Arboreum	„	1,100	
Abies Webbiana	„	24	
Walnuts	„	1,156	
Horse-Chestnuts	„	160	
Hazel nuts, common hill variety	„	37	
Horse-Chestnuts	not transplated	4,000	
			13,800
Plants in Pots.			
Deodar		340	
Capressus torulosa		1,000	
Pinus longifolia		400	
„ Gerardiana		160	
Abies Webbiana		240	
Cryptomeroa japonica		380	
Abies Smithiana		180	
Quercus incana		200	
Furze, Ulex Europœa		240	
Broom, Yellow		300	
Laburnum		80	
Bamboos		60	
Broom, White		230	
Miscellaneous varieties		440	4,250
	Total ...	...	18,050

List of new introductions.

1. Biota Orientates.
2. Capressus macrocarpa.
3. „ Lusitanicus.
4. „ Majestica.
5. Juniperus Virginiana.
6. Picea Balsamea.
7. „ Pinsapo.
8. Pinus insignis.
9. „ Austriaca.
10. „ Laricio.
11. „ Maritima.
12. „ Montana.
13. „ Sylvestris.
14. Thuja occidenlates.
15. Wellingtonia Gigantia.
16. Berberis fuchsioides.
17. Calycanthus precox.
18. „ „ rosea.
19. Ceanothus Africanus.
20. „ Americanus.
21. Cytisus Alpinus.
22. Eleagnus Augustifolius.
23. Capressus funebris.
24. „ horizontalis.
25. „ Sempervirens.
26. „ „ pendula veva.
27. „ Lawsoniana.
28. Platanus Orientalis.
29. Phuja Partarica.

JULLUNDUR DIVISION.

Remarks by Commissioner.

Remarks.—The rainfall in the several Districts during the past four years is shown in the table below, having been extracted at the cost of some labour from the monthly reports submitted to the Financial Commissioner and published in the *Punjab Gazette*, as the figures in the District statements accompanying, and those exhibited in the printed returns on arboriculture for past years, have been in most cases found to be unreliable.

	1883-84.	1884-85.	1885 86.	1886-87.
Kangra	65·42	65·2	65·42	56·9
Hoshiarpur	36·35	36·3	36·35	40·3
Jullundur	28·70	26·5	28·70	26·5
Ludhiana	25·99	27·8	20·57	21·7
Ferozepore	19·70	12·9	19·70	14·9

The rainfall has nowhere in the Division been so much above or below the average as to effect operations in arboriculture to any very material degree. The Deputy Commissioner of Jullundur, however, reports (although, taking the whole year, it was not below the average) that "in consequence of little or no rainfall in the cold weather, the District Board had to employ a larger watering establishment for road-side trees." In Ferozepore, new plantings were to some extent affected, as about 34 per cent. of young plants withered on tracts where (particularly in the Muktsar tahsil) canal water could not reach them.

The total length of roads in the Division on which avenues exist or are in course of being planted is 11,360,800 feet, and the length of single lines of trees or established plants on these roads, at the end of the year, was 7,644,800.

The work done during the last three years in the several Districts of this Division, taken collectively, may be seen from the following table:—

	1884-85.	1885-86.	1886-87.
Length in feet of single lines stocked with trees or established plants at the beginning of the year. ...	10,069,441	9,575,533	9,944,950
Length in feet of single lines planted during the year. ...	420,175	959,322	458,050
Total ...	10,489,616	10,534,855	10,403,000
Length in feet of single lines on which cultivation has failed or on which trees or established plants have been destroyed or felled. ...	914,083	693,053	146,613
Length in feet of single lines stocked with trees or established plants at the end of the year. ...	9,575,533	9,841,802	10,256,387

The difference of 103,148 feet between the total length of single line of avenues planted up to the end of 1885-86, as shown in the table above (*viz.* 9,841,802 feet) and the total at the beginning of 1886-87 (*viz.* 9,944,950 feet) is thus accounted for. (1) The road from Jullundur to Kartarpur and thence to Kapurthala, on which the single line of trees covers a length of 105,600 feet, was formerly under the charge of the Executive Engineer, Public Works Department, Provincial Division, and was consequently not included in previous years returns. The road has however been transferred since the close of 1885-86, under the orders of Government, to the District Board. (2) The figures for the Hamirpur tahsil, of the Kangra District, were not correctly given in the statement rendered last year, while those in the return for 1886-87 were entered after careful measurements had been made: this necessitated alterations, reducing the total length of single lines in the District (at the end of the year 1885-86) from 3,107,568 (*vide* column 5 of printed statement for that year) to 3,105,116 feet.

FEROZEPORE DISTRICT.

Statement of avenues.—In the Ferozepore District statement it is shown that cultivation had either failed or that trees or established plants had been destroyed or felled on a total len th of no less than 1,379,920 feet. The entry is obviously incorrect, as the plantings of the yer, added to the total length of single line at its beginning, give the total at the end of March last as exhibited in column 5 of the statement. Moreover, the Secretary to the District Board in his report to the Deputy Commissioner, explains that only 20 per cent. of the trees planted failed. On referring to the printed returns of previous years for this District, I find that column 4 has been invariably left blank ; he entry made in the statement submitted by the Deputy Commissioner having been ignored. Yet this can scarcely be correct, as there can be no doubt that many trees were cut or blown down or destroyed, and that numerous plantings must have failed. The only conclusion to be drawn is that the entry in column 2 must be taken to represent the number of feet on which plants have actually taken successfully ; while the entry in column 4 probably shows the number of feet on which plants have failed or been removed since the avenues were first started on the total length of 3,863,640 feet of road-way !

Further remarks in regard to road-side planting in the several Districts of the Division.—The work done in the way of planting has been very satisfactory in the Kangra, Jullundur and Ferozepore Districts. Gaps in existing avenues appear to be regularly filled in as they occur, and a large number of trees have been planted in these Districts each year. Owing to the difficulty of watering the plants in the Kangra District and the paucity of funds at the disposal of the District Board, a very large proportion of trees planted die annually—more than half or about 55 per cent. of the number planted within the last three years have died.

In the Hamirpur tahsil, the plantings on only 18,000 out of 57,000 feet of single line were successful, and in that of Plach on but 8,000 out of 37,000 feet. In regard to the work done in the Jullundur and Ludhiana Districts, details are given in the remarks column of the statements and need not be here repeated. In Jullundur, on the road from Rahon to Phillour "about 75 per cent." of the trees planted in 1886-87 are reported to " have died out in consequence of neglect in watering them." This speaks very badly for the supervising staff. Of the work in the rest of the District, however, the report speaks favorably. The Deputy Commissioner of Ludhiana writes very disparagingly of the progress in arboricultural operations since the District and Local Boards have had the work under their control, and I need only invite attention to his report, in which he lays bare a deplorable state of affairs under the present management, and I would commend to notice the suggestions contained in para 8. In para 12 of his report, the Deputy Commissioner of Hoshiarpur gives a table showing the number of trees planted to fill in gaps in existing avenues, the number which have failed and the number which have taken successfully ; and I need hardly add more than that the results are highly satisfactory; seeing that only 2·15 per cent. of the entire number of trees planted during the last two years had failed up to the close of March last. The Secretary to the District Board, Ferozepore, reports that 139,712 trees were planted on road-side avenues during 1886-87, of which some 20 per cent. died: the number planted in 1885-86 was 57,248, but it is not stated what proportion of this number died.

Description or species of trees planted.—The description of trees planted in the several Districts is the same as heretofore reported, and it is needless to repeat what is fully detailed in column 6 of the District statements. In Ferozepore, however, great pains were taken by Mr. O'Brien, while he was Deputy Commissioner of the District, to cultivate the date palm and mangoe ; seeds of the former having been obtained from the Persian Gulf as well as from Mooltan and Attari. The seeds have germinated and the young plants are said to be flourishing. Mangoe seeds were extensively sown too by Mr. O'Brien, and though many of the young plants are reported to have suffered from frost during last winter, the majority are progressing very favorably. A full account of the experiments is given in Colonel Birch's letter No. 241 of 20th June last, which accompanies.

Groves.—The total area under groves in this Division at the end of the year 1886-87 was 763½ acres ; being five acres less than the area shown in the statements for the year previous. Only in the Jullundur and Ferozepore Districts do the figures differ from those of 1885-86. In that year the area under groves in the former District was 206½ acres, while the return for 1886-87 shows only 173½ acres, or 33 acres less. In Ferozepore, on the other hand, the figures for the former year were 409½ acres and those for the latter 427½ acres, or 28 acres more.

Jullundur District.—The falling-off in Jullundur is due to the fact that " the area of two groves, *viz* : Jania and Nirajwala, in the Nakodar tahsil, was washed away by the river during the past year, and that of Mandi and Kassu, in the same tahsil, in 1884-85." Thus the number of plantations on the banks of the Sutlej has been reduced from 23 in 1884-85 to 20 at the close of 1886-87. The Deputy Commissioner also reports that "the trees of the plantation at Lisarah in the Phillour tahsil were sold last year for Rs. 1,805, and the area amounting to 31 acres will be sown with trees in the present rainy reason."

Ferozepore District.—In the Ferozepore District the increase of 28 acres in the area under groves is reported to have been newly planted: in the year previous too, a considerable area was planted, *viz.* 61½ acres. A very much larger number of trees was, however, put down during 1886-87, *viz.* about 63,000, as against 22,300 in 1885-86, of which 21 per cent. died; while in the last year under report 34 per cent. died, as already mentioned in para 4, owing chiefly to want of rain.

Nurseries.—The total area under nurseries in the Division was 100¾ acres at the close of the year 1886-87, of which the actual area stocked with plants was nearly 74 acres. The largest nurseries in the Division are those in Dharmsala, which are stocked with valuable Deodar, kail and chil,—these cover an area of 37½ acres and are well looked after.

Nurseries in Jullundur District.—The District of Jullundur claims the largest number of nurseries, *viz.* 21, or one more than the number reported in 1885-86, a new nursery having been established in the village of Jamsher in the Sadr Tahsil: the largest of the nurseries in this District, however, covers an area of only a little over two acres. In 1885-86, one nursery at Phillour was surrendered to Government with some land adjoining, for a new encamping-ground. In lieu of this, it is contemplated to acquire some of the old cantonment land in Phillour, and to establish a new nursery there. The nurseries are well stocked, and in addition to plants taken therefrom for road-side avenues, over 45,000 were given gratis to zamindars, and to the Executive Engineer and the Military Department within the last three years.

Ludhiana District.—In the Ludhiana District there are five nurseries: those within the Sadr tahsil are reported to be well attended to. The Deputy Commissioner has very full remarks on the subject in his report, which I need not repeat, but would at the same time commend to notice. A new nursery has been started in the District at Khanna, though unfortunately all operations have for the present been stopped in this direction for want of funds.

Ferozepore District.—In column I of the Ferozepore District statement, the total area shown, as set apart for nurseries, is 22¼ acres, while the statement for 1885-86 shows only 8¼ acres. The increase has been accounted for by the remark that 12 acres at a place named Kalgarhi, and 2 acres at Bhura, were "taken back from zamindars who had failed to fulfil the terms of the mafi." This note, however, is hardly sufficient in itself, and the matter should have been explained by the Deputy Commissioner. Of these 14 acres again, 2 acres are shown to have been sown or planted during the last year, and the remainder as land "on which cultivation has failed or from which plants will be removed." Of the remaining 8¼ acres, 7 acres are reported to have been stocked with trees or established plants at the end of the year 1886-87. The species of trees cultivated are mangoe, date, shisham, farash and kikar.

Further remarks in regard to Ferozepore District, and the report rendered by the Secretary to the District Board.—As usual, Rai Maiya Dass, Secretary to the District Board, Ferozepore, gives some account of the plan adopted in the District of planting on road-sides and holding the watering establishment responsible, under penalty of fine, for the progress of the young trees; the system being the same as that remarked on at page IX of the printed report for 1883-84, and which was recommended for general adoption. It does not appear, however, to have been tried in any of the other Districts of this Division. Furthermore, Rai Maiya Dass brings to notice a scheme for extending arboriculture, which has been tried with some success, of planting and sowing at two different seasons—from January to March and again from July to September—holding the establishment responsible for the amount of work required to be done within given localities in the space of time mentioned. The report concludes with a somewhat elaborate detail of rules for general management, sowing, planting, fencing, felling, pruning, thinning, &c. Some account is added of experiments made to grow the Australian saltbush, which, however, have not so far proved successful, probably owing to want of more perfect instructions as to time and mode of sowing and cultivating generally; but a further experiment is being made.

Gardens.—As to gardens, the Deputy Commissioner of Kangra says nothing more than that "ornamental gardens exist at Dharmsala, Palampur, Kulu, Hamirpur and Dehra," and the Deputy Commissioner of Hoshiarpur has no remarks on the subject at all; indeed the report rendered by Mr. Harris is meagre in the extreme.

In the Jullundur District there are five public gardens,—*viz*, (1) the Empress or Town Hall garden at Jullundur (Civil lines), (2) the Jullundur tahsil or "Narain" garden, (3) The Katchery compound garden, (4) The Nawashahr Baradari garden, and (5) The Nakodar nursery garden. Full details regarding these are given by the Deputy Commissioner. 11 kanals of land have been added to the first named and hopes are entertained of the income in due course being much increased. With the exception of the Nawashahr Baradari garden, which is self-supporting, as it contains many old fruit trees, all the gardens in the

District are worked at a loss—the expenditure being very considerably above the income. The following figures show for the past three years the amount by which the outlay exceeded the receipts :—

	1884-85.	1885-86.	1886-87.
	Rs.	Rs.	Rs.
(1) Empress garden	1,201	1,302	1,396
(2) Tahsil „	287	230	950
(3) Katchery „	189	197	178
(5) Nakodar „	Not stated in Distt. Report.	184	141

The Empress, Tahsil and Nakodar gardens are maintained jointly from District and Municipal funds ; while the garden in the Katchery compound and that at Nawashahr are kept up entirely by the District Board—though, as mentioned before, the latter pays for itself. The extraordinary expenditure during the last year under report at the Jullundur tahsil garden, was due to the sinking of a new well on an improved plan at a cost of Rs. 707.

Ludhiana and Ferozepore Districts.—Beyond mentioning what the income from and expenditure on "Ornamental gardens" has been during the past three years, the Deputy Commissioner of Ludhiana has furnished no information on the subject, while the Deputy Commissioner of Ferozepore, and Secretary to the District Board have not touched on the matter of gardens at all.

Establishment.—As the District statements of "expenditure incurred on arboricultural operations" exhibit *separately* the cost of the establishment, it is unnecessary to repeat figures here. In the Kangra, Hoshiarpur and Jullundur District reports, full details are given of the strength of the establishment maintained, but no such particulars have been furnished by the Deputy Commissioners of Ludhiana and Ferozepore, and the Commissioner is unable therefore to note briefly, as he would wish to do, what the entire staff employed in the Division is.

Income.—The income for the past four years is noted in the table below :—

	1883-84.	1884-85.	1885-86.	1886-87.
	Rs.	Rs.	Rs.	Rs.
Kangra	182	448	322	391
Hoshiarpur	14,135	not stated by Dy. Comr.	4,633	3,617
Jullundur	4,497	6,087	7,314	9,364
Ludhiana	2,638	2,600	2,811	3,272
Ferozepore	1,508	2,732	2,688	2,915
Total ...	22,960	11,867	17,768	19,559

Remarks as to income in Hoshiarpur District.—It is much to be regretted that the Deputy Commissioner of Hoshiarpur has not given any figures for past years in his report : those for the year 1884-85 would have been very useful for the purpose of comparison with the large receipts during the year preceding, amounting to Rs. 14,135, as against Rs. 4,633 in 1885-86 and only Rs. 3,617 in 1886-87. No reason has been offered for the falling-off, but it has to be remembered that the high figure of the year 1883-84 was exceptional to a very considerable degree, owing to the extensive felling of old trees, which alone yielded a return of about Rs. 12,000 and greatly swelled the total income, as may be judged from a glance at the following figures for the three years preceding :—

Income during	1880-81	Rs. 8,581.
„ „	1881-82	„ 6,441.
„ „	1882-83	„ 7,714.

Jullundur District.—The increase in the Jullundur District is explained to be due to two causes : (1) "The total income and expenditure of both District and Municipal funds having been entered in the statements of the past two years instead of the portion credited and debited to District funds only, as was done previously," and (2) to "larger income from sale of trees and grass, and specially from sale of timber from plantations (Rs. 1,000 were realized from one plantation in 1885-86 and Rs. 1,805 from another in 1886-87").

Income in other Districts of the Division.—No reasons have been given by the Deputy Commissioners for the increases and decreases in the other Districts of the Division : it would have been satisfactory to know the cause of the rise in the Ferozepore District of over Rs. 1,200 in the receipts during 1884-85, compared with those of the previous year.

Expenditure.—The tabular form below shows the expenditure for the same period for which the income has been noted above :—

	1883-84.	1884-85.	1885-86.	1886-87.
	Rs.	Rs.	Rs.	Rs.
Kangra	1,170	1,614	1,815	1,667
Hoshiarpur	5,849	not stated by Dy. Comr.	7,270	8,809
Jullundur	5,991	5,792	7,116	7,826
Ludhiana	4,578	5,920	6,253	6,209
Ferozepore	7,129	8,152	8,400	9,692
Total ...	24,717	21,478	30,854	34,203
Total Income ...	22,960	11,867	17,768	19,559
Deficit ...	1,757	9,611	13,086	14,644

Kangra District.—No explanation has been given for the increased expenditure in the Kangra District during the past three years; but a reference to the statements for the three years preceding that for which the last report was rendered, will show that comparison with the figures for 1883-84, *viz.* Rs. 1,170, is of little use, as in 1882-83 the outlay was as high as, Rs. 2,472 ; while, on the other hand, in 1880-81 and 1881-82 it was only Rs. 695 and Rs. 650 respectively.

Hoshiarpur District.—In Hoshiarpur too, the outlay has, during 1885-36 and 1886-87, far exceeded that of the year 1883-84 (figures for 1884-85 again not having been given by the Deputy Commissioner). There is no doubt the expenditure in this District is far too high ; this is acknowledged by the Deputy Commissioner in his report and certain remedial measures suggested as to management and supervision, which are worthy of consideration. Mr. Harris remarks " probably something will be done towards altering the system in next year's Budget Committee ;" and this is undoubtedly called for.

Jullundur District.—The increase in expenditure in the Jullundur District during 1886-87 is explained by the Deputy Commissioner to be due to a sum of Rs. 707 having been spent in the construction of a new well at the " Narain" or Jullundur tahsil garden, and to larger outlay on the extra establishment employed for watering the young plants on road-sides ; but nothing has been said to account for the rise of Rs. 1,324 in the expenditure during 1885-86, over the outlay of the year before.

Ludhiana District.—The figures of the Ludhiana District hardly call for notice at first sight, seeing that the outlay during 1885-86 and 1886-87 has only exceeded that of the year 1884-85 by about Rs. 300 ; but it would have been satisfactory to have received some explanation of the increase of Rs. 1,342 during the latter year over the outlay of the one preceding ; and going back still another year, it is found that the expenditure was then Rs. 4,000 only, or Rs. 2,000 below that of the year 1883-84.

Ferozepore District.— In the Ferozepore District, the outlay has been somewhat excessive and has increased year after year. The expenditure during the last year under report, it will be seen, exceeded that of 1883-84, by no less than Rs. 2,563. For the rise of Rs. 1,292 over the figures of the year 1885-86, it is explained that heavy outlay was incurred in obtaining from distant parts large quantities of the Arabian date seed, as also seeds and young plants of the mangoe and other varieties of shady and useful trees for road-sides, but if the experiments inaugurated by Mr. O'Brien are maintained, this expenditure will be fully justified.

Fodder trees.—In regard to the subject of the planting of trees which could be utilized as fodder, to which attention was invited in the Government of India letter No. $\frac{1019}{168-2}$ A., dated 5th December 1885, received under Mr. Wild's forwarding letter No. 1819 of 7th January 1886, the Deputy Commissioners of Kangra and Jullundur have made brief remarks, showing that there is no necessity to cultivate fodder plants in these Districts. On the 19th of January 1886 the District Officers in this Division were all addressed by me, and asked to specially mention the subject in the next report submitted. A year ago the Deputy Commissioner of Hoshiarpur wrote showing that no necessity existed for the planting of fodder trees, and furnished a list of a large variety of plants which grow wild almost all over the District, and which, in the event of prolonged drought, could well be utilized for fodder.

The Deputy Commissioner of Ludhiana (then Mr. Wakefield) also wrote about the same time stating that the zamindars were in the habit of keeping fodder " in store for at least two years in case of a necessity arising, and have also kikar trees in abundance planted on their village lands which would supply fodder for cattle in case of drought." In regard to kikar trees, Mr. Walker, the present Deputy Commissioner, has some remarks

in his report: he shows that the tree is not popular with the zamindars, who ever, he says, "that one full grown kikar tree renders useless a full kanal of land," and when he proposed, "at a District Board meeting to distribute kikar seed to all the members, who were to send in a statement of the roads and places where they had sown it," his proposal found little favour, and some few of the members broke out into open remonstrance"! I think it must be admitted that in a highly cultivated District, the shade of the kikar assuredly is very prejudicial to crops.

Remarks as to general scheme for District arboricultural operations.—A circular was issued by the Commissioner to all District officers in the Division in January 1885, with reference to the remarks of His Honor the Lieutenant-Governor, contained in para. 6 of the review of the Provincial Report for 1883-84, as to the necessity of preparing a scheme which they could propose for the guidance of arboriculture operations. This circular, together with the replies received and the whole file of correspondence, is forwarded herewith in original for perusal and return, and any orders it may be thought desirable to issue to Deputy Commissioners.

In conclusion the Commissioner feels it necessary to record that so far the experiment of making over arboricultural operations to District Boards has been the reverse of successful, and in all cases it should be a rule that Tahsildars shall supervise these operations.

8.—LUDHIANA DISTRICT.

General remarks.—The expenditure on tree-planting during the last three years and the number of trees planted are shown in the following statement :—

	Expenditure on planting of trees.	*Number of trees planted on road side.*
1884-85	3,612	4,217
1885-86	3,730	4,570
1886-87	3,701	3,607

The expenditure is very much below the mark considering the importance of the subject, and a still more regretable feature is the total inadequacy of the work done in comparison even to the small expenditure shown. No extension work was done at all, only existing avenues received any attention.

I had hoped to be able to furnish an exact statement of the number and condition of the trees existing on each road, but there was no establishment which could be relied on for the preparation of accurate statistics, and although the District Committee have now sanctioned the appointment of a Darogha, there has not been time to take action on the sanction.

The large number of full grown trees which some of the roads under the District Board possess notwithstanding that the soil is too light and arid to be favourable to arboriculture, shows that considerable attention has been paid to the subject in past years: but an examination of the statistics of work done in last three years and its results; and still more a local inspection of these roads on which a staff professed to have been employed, force one to the conclusion that the very necessary element of supervision has been entirely wanting. Brick or mud enclosures have been built at some time or other for protective purposes, and young trees have been planted inside them; but the enclosures have been allowed to fall into a dilapidated condition, and the young trees have died for want of water.

The cause of this deplorable condition of things is not far to seek. Arboriculture was a subject to which I believe Mr. Wakefield paid considerable attention, and it could only have been due to his efforts that some of the roads now possess in parts good avenues of trees of some years growth. But during the last two or three years, there has been a desire to give Local Boards every opportunity of exercising full and unrestricted control over matters connected with Local funds, particularly over such matters as seem to afford the least opening for the abuse of their new power in consequence of the too sudden removal of outside interference. In this District arboriculture was evidently one of the subjects selected by Mr. Wakefield to make over entirely to Local Bodies in the hope that they would recognize and act on the responsibilities with which they were invested. I regret to have to state that the experiment has been a failure, and the reason for the failure is that the Local Bodies have been in the habit of leaving the supervision and the payment of the watering and planting establishment, the pruning and lopping of trees, and the sale of their wood and cutting absolutely and unreservedly in the hands of the only official they had in their employ, namely the Sub-Overseer of their circle. The result of such an arrangement can be imagined. I have discussed the matter with several of the members of the Local Bodies and I believe they will admit that I am not overdrawing the case.*

Nurseries.—There are five nurseries in the District, one at Ludhiana itself, which, receiving as it does, full attention and supervision, gives satisfactory results. A second is a Bassian where a large rest-house stands. Here again the nursery is will looked after

* All these point to an exceedingly lax supervision or want of supervision on Deputy Commissioner's part to be accounted for by his dislike to going into camp as he should have done.

as Bassian rest-house is often visited by the Officers of the District. The third at Samrala tahsil possesses ample ground, good means of irrigation and a large staff: but the tree growing operations have hitherto been by no means commensurate with these advantages. There is a large enclosure at Jagraon tahsil, intended originally, I imagine, for a nursery; but heretofore the staff allowed to it was quite insufficient. This has now been remedied. Siris, shisham and fruit trees of various sorts are grown in these nurseries, and are distributed freely to any of the villagers who take the trouble to ask for them. The existing nurseries, though quite sufficient, as far as producing power goes, to supply the District, are not conveniently situated, except for certain roads; one more nursery has now been started at Khana, but further operations in this direction must be postponed until more funds can be provided for arboriculture in next year's budget. The expenditure on nurseries during the three years is shown below. Much more I hope will be expended this year, if the funds allow of it.

1884-85.	1885-86.	1886-87.
698	625	778

The villagers appear generally glad to get fruit trees to plant out, and I hope to utilize this taste for the purpose of teaching them that the cultivation of trees is by no means the unprofitable business they imagine it to be. As might be expected in a closely farmed district like this, where they cultivate every inch of land that is culturable, they have a strong objection to road-side avenues, averring that one full grown kikar tree renders useless a full kanal of land. I am told that one unmetalled road which was fairly well lined with kikar trees has now been left perfectly bare; the trees having been gradualy cut down by the zamindars in the course of several years. A proposal I made at the District Board meeting to distribute kikar seed to all the members, who were to send in a statement of the roads and places where they had sown it, evidently obtained little favor, and some few of the members broke out into open remonstrance. I pointed out to them the serviceable qualities of the trees, but to no effect. For their tools I imagine they get sufficient wood from their village common, and for fuel, they still utilize the cowdung cake.

Under these circumstances I am of opinion that the avenue-growing of trees in this district should be confined to a few of the most important lines of communication which are within reach of supervision. These should retain their establishment for initiative work until they are lined throughout with well grown trees that do not need further irrigation—and should also always be allowed a separate establishment for protection of existing trees and for filling in gaps caused by the fall or decay of old trees. The balance of the funds allowed for arboriculture should be devoted to the growth of nurseries at all places where occasional supervision is certain to be given: for the present a large space of ground in each nursery should be allotted to the growth of fruit seedlings, as these only are in demand among the zamindars.

Little can be done this year in the direction of extending the tree-growing operations owing to the want of funds—as it is, the additions to the staff that have been considered absolutely necessary if any satisfaction is to be obtained out of our expenditure, are likely to call for sanction to an increase in the Budget grant for arboriculture, but much can be done by supervision, and every effort will be made to obtain an adequate result in return for such expenditure as the Committee finds itself able to afford. I further hoped shortly to put on record a scheme of work in keeping with the suggestions contained in Section 13 and other portions of the Arboriculture Committee's report of April 1886.

Financial results.—The financial results of the three years under report were as follows :—

	1884-85.		1885-86.		1886-87.		
	Income.	Expenditure.	Income.	Expenditure.	Income.	Expenditure.	
Ornamental gardens ..	...	1,610	108	1,808	165	1,730	
Nurseries	120	698	43	625	132	778	
Avenues and groves ..	2,480	3,612	2,660	3,730	2,716	3,701	
Afforested wastes ...	...	..	...	..	259	..	
Total	2,600	5,920	2,811	6,253	3,272	6,209	

The income from sale of wood is made mostly on trees that have decayed through old age or have been blown down by the wind.

9.—FEROZEPORE DISTRICT.

Income.—There is an increase of Rs. 227 in the income against that of last year, and it is attributable to the gradual development of trees which when old or otherwise blown down are sold; also to more systematical lopping of trees than was practised heretofore.

Expenditure.—There is also an increase of Rs. 1,292 of expenditure on avenues and groves above that of the preceding year for the following reasons, *viz*: Arabian dates and mangoes and many other plants were procured from distant stations by railway and other means which cost a considerable sum, and also several new nurseries of date, mangoes and other useful and shady trees have been established in this district.

Description of work.—Kerwala plantation.

Groves.—New groves have been planted on 28 acres of land during the year under report, against 61 acres 2 roods planted in the previous year, and as special attention was paid to the establishing of nurseries during the year, hence less land was taken up for new groves.

The number of trees planted during the year under report in groves is 63,956 which cost Rs. 5,211 or 8·14 per cent, out of which 22,336 or 34 per cent. have died, while during the last year 12,144 trees were planted at a cost of Rs. 3,463 or 28 per cent. out of which 2,365 or 21 per cent. had died. The increase in the death of young plants was especially noticeable in that portion of the Muktsar tahsil where the canal water cannot reach, and there was very little rain during the rainy season of the year under report.

Avenues.—The length of the lines planted during the year under report is 140, 641 feet or 1,27,362 feet more than that of the preceding year, on which 1,39,712 trees were planted at a cost of Rs. 4,481 or Rs. 3·32 per cent, out of which 38,438 or 20 per cent. have died, while in the last year 57,248 trees were planted at a cost of Rs. 4,900 or Rs. 8·55 per cent. This satisfactory result was achieved through the irrigation by the District Canals and digging well levelled lines along the roads for avenues.

Nurseries.—The area planted during the current year is 3 acres 3 roods, or 3 acres 1 rood more than last year. All these nurseries have been planted with large number of dates, mangoes, bakains, shisham and farash &c.

The chief trees planted during the year were mangoes, dates, shisham, farash, and kikar.

Note by Deputy Commissioner.

Description of work.—The late Deputy Commissioner, Mr. O'Brien, took great personal pains, and paid special attention to the cultivation of the date palm. He obtained several seers of seeds from the Persian Gulf, as well as several maunds from Mooltan, and sowed the seeds most extensively. One maund of date seeds were sown in the Attari nursery, covering about an acre of land which have all germinated and are progressing favourably. Two maunds two seers of seeds were sown in the Kutchery, Sessions House and Dâk Bungalow compounds, altogether covering an area of 10½ kanals of land, the seeds have also germinated and are mostly flourishing: some of the young plants are about 10 to 12 inches in height. It is believed that by next year they will be sufficiently big to be planted out. If successful, a great addition will, by these means, be made to the food supply of the district in time of famine.

Mangoe seeds were also very extensively sown by Mr. O'Brien; a few of the young plants suffered last winter from frost, but the majority are progressing very favourably and are now two to three feet in height. Both date and mango seeds were also distributed to some of the zamindars to encourage them in the cultivation of these kinds of trees. This has really been the first experiment in the cultivation of these kinds of trees in the district, and so far it is successful. The circumstances of this district are well adapted to the growth of these trees, and there is every hope of the experiment proving a success.

Mode of plantations.—The same old plan, as reported in 1883-84, has been adhered to in planting.

Another system of extending arboriculture has also been tried with some success during the year under report. The season of planting and sowing new trees has been divided into two parts, *viz.*, from January to end of March, and again in the rainy weather from July to end of September, and after due enquiry as to the amount of work that could be accomplished in each tahsil during each of the above two seasons, every jamadar of trees was told how much he had to do during each season, and where the men had failed to finish the work assigned to them they had to explain why it was not done. This system is very useful, inasmuch as each man in charge of his sub-division knows what work is before him.

It was found necessary to send the Darogah to the Changa Manga Forest Department to learn some practical lessons on arboriculture, although this man had worked well for several years, but it is absolutely necessary that he should also have some systematical training. The Darogah is expected to return to resume his work in a few months; in the meantime the work is carried on by the jamadars of their respective sub-divisions.

Australian salt bush.—I said in my last report that the seed of Australian salt bush was sown, and that the result will be reported in the next report, but as the seed was sent without any instructions as to the time of sowing and mode of looking after the plant, the new and foreign seed was tried in more than one place, and notwithstanding special care

having been taken of it the seed did not germinate, which was reported to the Director of Revenue and Settlement Records who sent the seed. He has again sent a small quantity of this seed with instructions from Doctor Quinnell who has tried it with success, although the said instructions have not been received from the country where the seed has come from, but it is the result of the experience gained by the Doctor. I have just sown the seed carefully again and hope to report better results hereafter.

The land for Kehruwala plantation (423 acres) was bought for Rs. 5,179 in the year 1883.

During the first year *i. e.*, 1883-84, 5 acres of land were planted with trees.

	Acres.
In 1884-85 ...	5
In 1885-86 ...	15
In 1886-87 ...	20

Total acreage planted with trees, 45 acres. Generally these trees have been planted alongside of ditches 15 feet apart from each others and irrigated during the hot weather by canal water. Nearly eight thousand young trees now stand on these forty-five acres. The tallest tree is 9 feet; the smallest (*i. e.*, last year's) being only about a foot high.

The trees are mostly kikar, which appears to flourish well on this land.

The land which could not be planted with trees all at once has been leased out and the following income realized :—

	Rs.	A.	P.
1884-85	258	10	6
1885-86	498	0	0
1886-87	554	11	8
Total to date ...	1,311	6	2

The following is the expenditure which has been incurred on the plantation to date :—

	Rs.	A.	P.
1883-84	100	0	0
1884-85	145	12	8
1885-86	244	1	6
1886-87	1,146	6	6
Total expenditure Rs. ...	1,636	4	8

The above includes the making of water-cut from the Canal, and a kutcha well; the digging of ditches for the trees and labor for planting, and cost of establishment; also the digging of a small tank to keep water when the inundation Canal stops and there is no rain.

JULLUNDUR DISTRICT.

General remarks.—The rainfall during the 3 years under report was as follows :—

	Inches.
1884-85 ...	28
1885-86 ...	22
1886-87 ...	21

while the average fall of the past 5 years is 26 inches. Last year in consequence of little or no rainfall in the cold weather, the District Board had to employ a larger watering establishment for road-side trees.

No event of any special nature affecting arboriculture occurred during the period under report.

Description of work.—(*a*) *Roads.*—The work was chiefly confined to the following new lines of road :—

(1). *Jullundur and Tandah road.*—This road is 19 miles long, of which about ½ mile consists of the bed of sandy *chos* or hill torrents, leaving 18½ miles under tree plantation. Up to the end of 1883-84 15½ miles of the road had been planted, the remaining 3 miles were planted—2 in 1884-85 and 1 in 1885-86.

(2). *Jullundur to Nurmahal viâ Jamsher.*—This road is 16 miles long, 8 miles in the Jullundur and 8 in the Phillour tahsil. Four miles had been planted in previous years, and 9 miles during the past 2 years, as detailed below :—

On the portion lying in the Phillour tahsil		2½ miles	during 1885-86.
Ditto	ditto	2½ miles	do. 1886-87.
Ditto	Jullundur	4 miles	do. do.

3 miles of the road in the Phillour tahsil remain to be planted, and this will be completed in the current year.

(3). *Nakodar to Sidhwan ferry viâ Mahatpur.*—This road is 12½ miles long and is entirely in the Nakodar tahsil. 5 miles were planted prior to 1885-86 and 7½ miles during 1885-86 and 1886-87.

(4). *Rahon to Phillour viâ Awar.*—This is the principal road to Phillour from the Nawashahr tahsil, and is 12 miles long from Rahon to the confines of the tahsil. Four miles were planted in previous years, 4 miles in 1885-86 and the remaining 4 miles in 1886-87. The trees planted last year were not so successful as previously, about 75 per cent. have died out in consequence of neglect in watering them. They are the farthest away from the tahsil and supervision is more difficult.

Except this road, the trees planted on all other roads have been generally successful as will be observed from the statement.

Besides the above new work, gaps, and blanks have been filled up in all the metalled roads of the District as well as in the principal kacha roads.

The work as detailed above, has been done in accordance with an arboriculture scheme carefully drawn up by the District Board and approved of by the Commissioner in February 1885. New lines of roads will be undertaken after the old ones have been well stocked with trees.

(6). *Nurseries.*—One nursery was established in 1886-87 in the Jullundur tahsil at Jamsher, while that at Phlillour was surrendered to Government in 1885-86, along with other land required for the new encamping-ground. A scheme for the acquisition of some of the old cantonment land and the formation of a new nursery at Phillour, is under consideration. The total number of nurseries, 21, is therefore the same as it was at the end of 1883-84.

In addition to trees planted on road-sides in the District, 45,267 plants were given to the Executive Engineer, the Military Department, and to zamindars free of cost from the nurseries as noted below :—

	No. of trees.
During 1884-85 ...	34,337
1885-86 ...	3,783
1886-87 ...	7,147
	45,267

Groves or plantations.—There are 20 plantations on the banks of the Sutlej, or 3 less than they were in 1883-84. The area of 2 groves, *viz.*, Jania and Mirajwala in the Nakodar tahsil, was washed away by the river during the past year, and that of Mundi-Kassu in the same tahsil during 1884-85.

The trees of the plantation at Lisarah in the Phillour tahsil were sold last year for Rs. 1,805, and the area amounting to 31 acres will be sown with trees in the present rainy season.

(1). *Public gardens.—Empress or Town Hall garden at Jullundur.*—This garden is maintained jointly by the District and Municipal Committees. The income and expenditure during the past 3 years were as follows :—

Year.	*Income.* Rs.	*Expenditure.* Rs.
1884-85	459 ...	1,660
1885-86	381 ...	1,690
1886-87	364 ...	1,760

The income of the garden is always fluctuating. The expenditure during the past 3 years has been normal.

In the current year 11 kanals of land have been added, and it is hoped the income will in future be much increased. This garden is kept up more as an ornament than a paying concern.

(2). *Narain or the Jullundur tahsil garden.*—This garden is similarly maintained by both Committees. The income and expenditure have been as follows :—

Year.	*Income.* Rs.	*Expenditure.* Rs.
1884-85	50 ...	337
1885-86	50 ...	280
1886-87	110 ...	1060

The abnormal expenditure during 1886-87 was on account of construction of a well on an improved plan at a cost of Rs. 707.

(5). *Katcherry compound garden.*—This garden is maintained entirely by the District Board, and the income and expenditure during the period under report was as detailed below :—

Year.	*Income.* Rs.	*Expenditure.* Rs.
1884-85	... ...	189
1885-86	... ...	197
1886-87	19 ...	197

The income of Rs. 19 last year was from sale of flowers and fruit; this will increase with the age of the trees.

(4). *The Nawashahr Baraddri garden.*—This garden is also maintained at the cost of the District Board, and it pays well as will be observed from the following memo, the reason being that the garden contains many old fruit-bearing trees:—

Year.	*Income.* Rs.	*Expenditure.* Rs.
1884-85	340	313
1885-86	350	389
1886-87	254	210

(5). *The Nakodar Nursery garden.*—This garden was prior to 1885-86 maintained from Municipal funds, but the District Board from that year in consequence of the establishment of a nursery in it, has shared the cost. The income and expenditure during the past 2 years have been—

Year.	*Income.* Rs.	*Expenditure.* Rs.
1885-86	...	184
1886-87	22	183

and as there is a nursery a large income is not expected.

Establishment.—The following establishment was employed:—

ROADS.

Besides the *nauker* coolies who are employed on metalled roads both for petty repairs to the roads and for watering plants, the District Board spent the following amounts on extra watering establishment:—

Year.	Rs.
1884-85	1,011 per annum.
1885-86	892 „
1886-87	1,157 „

NURSERIES.

The Jullundur Sadr nurseries.

	Rs.	
1 Gardener...	10	per mensem.
2 Mates @ Rs. 5 each	10	„
5 Coolies @ Rs. 4 each... ...	20	„
1 Coolie	3	„
Total ...	43	„ =Rs. 516 per annum.

TAHSIL NURSERIES.

18 coolies @ Rs. 4-8-0 each=Rs. 81 per mensum=Rs. 972 per annum.

GROVES.

	Rs.	A.	
1 Jemadar	15	0	per mensem.
5 Peons @ Rs. 4-8 each ...	22	8	„
Total ...	37	8	„=Rs. 450 per annum.

GARDENS.

Empress garden.

	Rs.	
1 Head gardener	15	per mensem.
1 Mate	8	„
1 Bhistie	4	„
7 Coolies @ Rs. 4 each ...	28	„
2 Ditto 2 „ ...	4	„
1 Sweeper	3	„
Total ...	62	„=Rs. 744 per annum.

Narain garden.

	Rs.	A.	
1 Gardener	3	8	per mensem.
2 Coolies	7	0	„
Total ...	10	8	„=Rs. 126 per annum.

Katcherry compound garden.

		Rs.	A.	
1 Gardener	... ...	3	8	per mensem.
2 Coolies	... ...	7	0	„
TOTAL	...	10	8	„=Rs. 126 per annum.

The same gardener works in both these gardens.

The Nawashahr Baradari garden.

		Rs.
1 Gardener	... ...	6
2 Coolies @ Rs. 4 each	... ...	8
TOTAL	...	14=Rs. 168 per annum.

Nakodar Nursery garden.

		Rs.
1 Gardener	... ...	6
1 Cooly	... ...	3
TOTAL	...	9=108 per annum.

The general supervision of arboricultural operations is entrusted to the Local Boards, but last year as the work was not properly done, Major Wood passed orders to the Tahsildars look to after this branch of the District Board work also. It is impossible to expect the members of the Local Boards to exercise any close and constant supervision,

FINANCIAL RESULTS.

Year.	*Receipts.* Rs.	*Charges.* Rs.	*Deficit.* Rs.	*Surplus.* Rs.
1883-84 ...	4,497	5,991	1,494	...
1884-85 ...	6,087	5,792	...	295
1885-86 ...	7,314	7,116	...	198
1886-87 ...	9,364	7,826	...	1,538

The increase under Receipts and Charges during 1885-86 and 1886-87 as compared with 1883-84 and 1884-85, is on account of the total income and expenditure of both District and Municipal funds having been entered in the statements of the past 2 years instead of the portion credited and debited to District funds only as was done previously.

Again there was a larger income from sale of trees and grass and specially from sale of timber from plantations (Rs. 1,000 were realized from one plantation in 1885-86 and Rs. 1,805 from another in 1886-87).

The comparatively large expenditure during 1886-87 was due to the construction of a new well at the Narain garden at a cost of Rs. 707, and to extra expenditure on watering establishment employed for roadside trees.

With reference to Commissioner's Circular No. 23-184, dated 19th January 1886, regarding fodder plants, there has never been, so far as has been ascertained, an actual failure of fodder, for Jullundur is thoroughly irrigated by a large number of wells all over the country which are every year increasing.

The probabilities of a fodder famine are therefore very few. Hence there appears no necessity to cultivate fodder plants in this District.

The Deputy Commissioner calls attention to the progress statement of avenues planted, in which the length of lines are to be denoted in feet. Suggests that the length of line be denoted in yards in future.

12.—HOSHIARPUR DISTRICT.

General remarks.—The total rainfall during the year was 39·5 inches. There were no fresh plantings, consequently no progress has to be recorded, the establishment being solely employed in maintaining plantings of previous years, and filling in gaps.

Description of work.—There are 2 small *jhiris* or groves in this district, the property of the District Board, *viz.*, at Dhomai in Tahsil Garhshankar and Pandogah in Tahsil Una. The total area of these groves is 3 acres and 36 poles. No revenue has been realized from these sources, nor are the groves of any extent.

Income.—The total income during the year has been Rs. 3,617, a detail of which is given below :—

Detail of income.	Name of Tahsil.				
	Hoshiapur.	Dasuah.	Una.	Garhshankar.	Total.
	Rs.	Rs.	Rs.	Rs.	Rs.
By sale of dry timber loppings &c. ..	979	129	213	1,154	2,475
,, fruit	392	111	50	20	573
,, grass	58	...	8	62	128
,, Khar Kana	...	41	...	199	240
,, Lakh	.	45	28	87	160
Miscellaneous	31	...	...	...	31
Total	1,460	326	299	1,522	3,607

The above figures do not include income from encamping-grounds.

Expenditure.—The total expenditure has been Rs. 8,809, a detail of which is given below for each Tahsil :—

	Hoshiarpur.	Dasuah.	Una.	Garhshankar.	Total.
	Rs.	Rs.	Rs.	Rs.	Rs.
Establishment	1,837	1,600	1,704	1,406	6,507
Miscellaneous	1,819	155	154	134	*2,262
Total	3,656	1,755	1,858	1,540	8,809

	Rs.
Extra Establishment	697
New pakka drains*	1,080
New mashaks	25
Feed of bullocks	164
Persian wheel	248
Miscellaneous	48
Total ...	2,262

Establishment.—The detail of establishment charges is given below—

Hoshiarpur Tahsil.

1	Jamadar	... ...	@ Rs. 10	per mensem.
1	Mali	... ...	,, 5	,,
18	Malis each	... ...	,, 4	,,

Dosuah Tahsil.

1	Jamadar	...	@ Rs. 7 0 0	per mensem.
3	Malis each	...	,, 5 0 0	,,
3	Do. ,,	...	,, 4 8 0	,,
22	Do. ,,	...	,, 4 0 0	,,
4	Do. ,,	...	,, 3 8 0	,,

Garhshankar Tahsil.†

1	Jamadar	... ...	@ Rs. 7	per mensem.
25	Malis each	... ...	,, 4	,,

Una Tahsil.†

1	Mali	... ...	@ Rs. 6	per mensem.
2	Malis each	... ...	,, 5	,,
22	Do. ,,	... ...	,, 4	,,
1	Do.	... ...	,, 3	,,

Total 3 jamadars and 101 malis.

There is also a temporary addition to establishment made during the hot weather, and the cost of this establishment during the year under report was Rs. 627.

The expenditure during the current year is Rs. 1,539 more than last year. This is due to masonry drains having been constructed in the Station gardens.

This expenditure in establishment is in my opinion in a district like this far too heavy. At least it is, I think, not applied in the right direction. On the Sirwal land of this part of the Doaba, as also in the lower parts of the Una Doaba, the trees do very well by them-

* These were in the station garden and should not have been charged to this head at all.—G. G. Y.

† This large establishment is not supervised at all. The members of the District Board do not exercise any real control and feel any real interest in the work.—G. G. Y.

selves after having attained a very slight growth, and this is to be expected in a country where sugar-cane grows unirrigated. I would suggest for future years that the District Board turn its attention to particular avenues on which after the trees have attained a certain height, they may in great measure be left to take care of themselves, and other avenues attended to thereafter. As the case stands at present, there can be no proper supervision of this heavy establishment, at least until individual members of the District Local Boards will take an interest in this. In consequence of want of proper supervision the malis, &c., are more village servants than Government ones. Probably something will be done towards altering the system in next year's Budget Committee.

The total length of roads in this district is 712 miles ; of this length 353 miles are planted out. No new line of road was planted during the year with the exception of a small piece of the Una and Pirnigaha road.

10,211 trees were planted during the year to fill in gaps of existing avenues, *viz.* in Tahsil Hoshiarpur 1,474, Dasuah 4,190, Una 1,182, and Garhshanker 3,365.

The following figures show the number of existing trees :—

	Hoshiarpur.	Dasuah.	Garhshankar.	Una.	Total.
	Rs.	Rs.	Rs.	Rs.	Rs.
No. of trees planted in previous year ...	41,374	63,516	62,940	53,522	2,21,352
Do. do. in 1886-87 ...	1,475	4,190	3,365	1,182	10,212
Total ...	42,849	67,706	66,305	54,704	2,31,564
No. of trees that failed during the year ...	1,504	2,106	1,209	995	5,814
Do. now standing ...	41,345	65,600	65,096	53,709	2,25,750

There are no regular nurseries in this district, but nurseries for the supply of seedlings and young trees exist in each of the encamping-grounds, also in the tahsil gardens.

13.—KANGRA DISTRICT.

General remarks.—During the last three years there was no drought, fire or other calamity in any part of the district especially affecting arboriculture, but many young trees are lost each year in the dry months before the rains, as funds are not available in this district for maintaining a proper watering establishment.

With reference to Commissioner's Circular No. $\frac{7}{8}$, dated 8th January 1885, it has been already pointed out that the want of sufficient funds prevents arboriculture operations being carried on in a very systematic manner ; the best however is done that the limited means at the disposal of the District Board admit of.

With regard to Commissioner's Circular No. $\frac{1}{8}$, dated 19th January 1886, it may be mentioned that there is no necessity in this district for paying any special attention to planting fodder trees more than other kinds. Grass preserves and forests abound throughout the district, and no scarcity of fodder is ever experienced.

Description of work.—Avenues.—The total length of the roads in this district is 922 miles, of which avenues are planted on 612 miles (or 32,33,896 feet). The length of single lines is 31,05,116 feet.

The subjoined figures taken from columns III and IV of the Returns, will give some idea of the progress made in road side tree-planting during the last 3 years—

Year.	*Planted in.*	*Lost in.*	*Percentage successfully planted.*
1884-85 ..	4,26,496 feet.	2,79,651 feet.	35 per cent.
1885-86 ...	3,69,487 „	1,39,657 „	63 „
1886-87 ...	1,44,209 „	92,293 „	37 „
TOTAL ...	9,40,192 „	5,11,601 „	46 „

The most satisfactory results have been attained on the Mandi and Phagwara road (a new road which runs for some 40 miles through the Hamirpur tahsil), and fair work has also been done in the Kulu, Plach, Palampur and Nurpur tahsils. In Kangra and Dehra, where nearly all the main roads have already good avenues, the work has consisted chiefly of replacing dead trees and filling up gaps on the existing lines.

The total length of lines on which trees were planted at the end of 1886-87 was 31,57,032 feet. No useful comparison can be made with the figures of previous years, owing to the obvious inaccuracy of the returns of such years.

Nurseries.—The total area set apart for nurseries is a little more than 44 acres, of which nearly 43 acres are actually stocked.

The nurseries in Dharmsala, where the larger portion of this area is situated, consist chiefly of deodar, kail and chil. A large quantity of seed of the different varieties was sown in 1884-85. These nurseries are well looked after and are in good condition.

The nurseries along the Mandi-Phagwara road in the Hamirpur tahsil are flourishing; those in Nurpur are supervised by the Municipal Committee, and contain Chinese mulberry which is in demand for sericulture purposes.

There are no groves or plantations, but ornamental gardens exist at Dhamsala, Palampur, Kulu, Hamirpur and Dehra.

Establishment.—Prior to 1885-86 there was no regular establishment, but in 1885-86 1 rakha on Rs. 5 per mensem was sanctioned for each tahsil of Kangra proper. In addition to this, a special establishment costing Rs. 25 per mensem is entertained for the Mandi-Phagwara road (a line of recent construction) on which a large number of trees are planted annually.

The total expenditure including a contribution of Rs.2-8-0 per mensem towards the pay of an additional rakha for Palampur, is Rs. 52-8-0 per mensem or Rs. 630 per annum.

There are 2 malis and 1 rakha on Rs. 5 each employed on the nurseries at Dharmsala under the supervison of the Kotwal who is allowed Rs. 10 per mensem. The total expenditure is Rs. 300 per annum. The other nurseries are looked after by the tahsil rakha or mali, and no extra expenditure is incurred.

The establishment employed on gardens is 2 malis at Dharmsala and Hamirpur on Rs. 11 per mensem, 1 at Kulu on Rs. 5, and 1 at Dehra on Rs. 5 per mensem, or Rs. 396 per annum in all.

With the exception of the nurseries at Dharmsala, which can be conveniently looked after by the Deputy Commissioner himself, the existing establishment works under the supervision of the several Local Boards to whom the tahsil roads have in most part been made over for repairs and maintenance. The Tahsildars are also required to interest themselves in the progress of arboriculture operations.

The Assistant Commissioner in charge of Kulu supervises the operations in that subdivision, and Messrs. Dane and Johnstone have done their best to further road-side arboriculture in Kulu, but the want of funds for entertaining a sufficient and skilled establishment has always proved a great obstacle.

Financial results.—The income and expenditure for the 3 years under report is given below—

	Expenditure.	*Income.*	*Deficit.*
	Rs.	Rs.	Rs.
1884-85 ..	1,614	448	1,166
1885-86 ..	1,815	322	1,493
1886-87 ...	1,667	391	1,276
TOTAL ..	5,096	1,161	3,935

The different heads of expenditure have been detailed above; the income consists of sale proceeds of dead trees, grass and fruit. The trees sold and credited to Provincial services is not shown in these returns.

14.—GURDASPUR DISTRICT.

General remarks.—Nurseries.—There were 8 nurseries at the beginning of 1884-85 in this District. To these were added during 1886-87 ten new ones, which were opened in various parts of the District on main lines of communication. Of these, three however have failed for want of proper arrangements for watering the trees.

Fences.—Fences are made of Cactus or of thorny branches of the kikar or phula, sometimes shisham branches are used when others are not procurable. The fencing is formed by erecting a circular mud enclosure, 1 to 2 feet high and 4 feet in diameter, round the tree with a trench outside it, and planting the Cactus or the thorny branches of trees over the mud wall. This constitutes the best and most economical fencing and answers the purpose of protecting the trees admirably well.

Watering.—Experiment was made last year of watering some mango trees at Sadr station with 'gharas' buried at the root of the trees. It was a success from a financial point of view, as one man could water in this way a larger number of trees, but it is doubtful if the plan would succeed on the District roads, for with all the supervision available at head-quarters a very large number of gharas were broken and had to be placed by new ones.

Species of trees.—In former years no distinction was made in selecting trees for road-side plantations, but the mistake of planting inferior trees where good ones will grow, was recognized by Mr. Coldstream, and only large fruit and timber trees, such as mangoe,

jaman and shisham are now planted in this District. A supply of the best kind of country mangoes and of seed of the Mawa (Bassia Latifolia) was obtained last year from the Saharanpur Botanical gardens, and these were sown in the Government garden nurseries. They will be fit for transplantation next year

Some Eucalyptus trees were planted in the Government gardens. They seem to thrive well on the canal bank or on wet soil.

Thinnings and Loppings.—On some District roads in the Gurdaspur tahsil where the trees are planted too close together, thinning operations were carried on last year very successfully. No trees were felled until they were marked out by the Secretary to the District Board or the Tahsildar.

Some large jaman trees on the Dinanagar and Bahrampur road near Awank were in December and March 1886-87 lopped of their lower branches which overshadowed the fields. The result was very statisfactory. A considerable area was restored to cultivation and the sale proceeds of the loppings realised a fair price while the trees continued to afford an equal amount of shade to travellers. The experiment will be tried elsewhere.

The injury done to the zamindars by road-side avenues is not sufficiently appreciated. In this District, acres and acres of land have been thrown out of cultivation by the shade of road-side trees, and hitherto the trees have always been planted at the extreme edge of the road, no matter how wide the road may be. If trees are planted on a wide road so as to leave a good broad pathway between their trunks, and the ditch marking the boundary of the road, the road is better protected, and the zamindars are saved from needless injury.

Description of work.—The following comparative table will show the amount of work done during the past three years :—

Year.	Length of single line stocked with trees during the year.	No. of trees planted	Description of trees planted.
	Feet.	*No.*	
1884-85 ...	24,229	2,953	Mangoe, mulberry, shisham, sukhchain, beyt, jaman.
1885-86 ...	75,085	5,210	Mangoe, jaman and shisham.
1886-87 ...	82,070	5,470	Do. do.

The planting operations were pushed on with great vigour by Mr. Coldstream during the rainy and winter seasons of 1885-86, and almost all the gaps on the roads leading from the Sadr station have been planted up for a distance of 4 and 5 miles from Guardaspur.

About 21 acres of land lying waste in the Civil station were planted with mangoe trees last year. All these trees have been securely fenced and regularly watered.

Hitherto arboricultural operations have been restricted for want of a sufficient supply of plants, but now that new nurseries have been opened, it will be possible to carry on operations on a more extensive scale. A very large number of cuttings of fruit and other trees (between 15 to 16 thousand) were planted during the past year in the nurseries of the Government garden, but owing to absence of rain and the unusual dryness of the autumn and winter season, a great many of them have dried up. It is, however, believed that the number remaining will prove abundant for the requirements of the District.

During the past three years extra gangs of bhistis were employed in planting trees during the rains and in the winter season.

Miscellaneous.—An experiment of burning charcoal in pits was made last year in the Government gardens, the charcoal turned out was good, and it was all sold in a short time, but from a financial point of view, the experiment was not a success. It seems that the manufacture of charcoal will prove remunerative only in places where there is difficulty in carrying wood to the market, and when the charcoal is made from inferior kinds of wood.

Establishment and supervision.—The following is a detail of the arboricultural establishment of the District during the past three years :—

	1886-87.	1885-86.	1884-85.
	Rs.	Rs.	Rs.
Superintendent of arboriculture on Rs. 50 a month ...	600	600	
SADR STATION.			
1 Jamadar @ Rs. 8 96			
6 Malis @ 5 each ... 360 ...	456	456	
GURDASPUR TAHSIL.			
2 Jamadars @ Rs. 8 and 7 ... 180			
16 Mails @ Rs. 5 each ... ... 960 ...	1,140	636	
BATALA TAHSIL.			
1 Jamadar @ Rs. 10 120			
11 Mails @ Rs. 5 each ... ... 660 ...	780	636	5,072
PATHAN KOT TAHSIL.			
1 Jamadar @ Rs. 8 96			
12 Mails @ Rs. 5 each ... ... 720 ...	816	636	
SHAHAGARH TAHSIL.			
1 Jamadar @ Rs. 8 96			
15 Mails @ Rs. 5 each ... ... 900 ...	996	996	
Contingencies	281	300	
Working and Establishment of gardens and nurseries...	2,463	1,905	
TOTAL ...	7,532	5,865	5,072

Financial results.—The income has been :—

	1886-87.	1885-86.	1884-85.
	Rs.	Rs.	Rs.
By sale of road-side trees	2,443	1,790	
,, mulberry leaves	260	133	
,, Grass	104	18	
,, Fruit of road-side trees	225	...	1,684
,, Lac	3	4	
Income of gardens and nurseries	887	886	
TOTAL ...	3,922	2,831	1,684

It will be seen that the income has been steadily increasing every year, and there is reason to hope that in a few years' time when all the fruit trees planted on District roads and in the Government gardens commence bearing, there will be a further considerable expansion of revenue. At the same time the results are decidedly disappointing. There is no district in the Punjab better suited for arboriculture than Gurdaspur, and yet there is a net deficit on the three years of Rs. 10,032 ; wood seems to sell very badly in the district, and the prices obtained for fallen trees on the road-side are very low. The district is generally well wooded and unless the arboricultural operations can be made to pay their way I think that they should be curtailed, and expenditure restricted. If I were to remain in charge of the district, I should be disposed to try tree-planting by contract instead of by daily labour. The expenditure on establishment is enormous.

15.—AMRITSAR DISTRICT.

Description of work.—Tree-planting.—The progress made in tree-planting is given in the following table:—

	Number planted in nurseries.	*Number planted on road-side.*	*Total.*	*Number died.*	*Balance.*
1884-85 ...	64,800	7,075	71,875	31,600	40,275
1885-86 ...	13,000	4,512	17,512	3,000	14,512
1886-87 ...	15,500	3,866	19,366	4,200	15,166
Total ...	9,330	15,453	1,08,753	38,800	69,953

Nurseries.—In 1884-85 four new nurseries were established, *viz*: Gilwali, Sheron, Sirha and Chogawan, and a large number of timber and fruit tree-seedlings were put down, of which a great number died suddenly that year as will be seen from the above figures; since then these nurseries are in a flourishing condition. The latter is the largest in the District. It covers an area of 9½ acres of land. It was previously only a nursery, but has now sprung up into a nice garden, consisting of fruit trees, such as mangoes, peaches, loquats, guavas, limes, oranges, plantains, &c. A plot of land in this garden is reserved for a nursery, and a large number of timber and fruit plants are thriving well, from which supplies are issued to a considerable extent for road-side purposes and for private use gratis. At an average, 3 acres of land are sown annually with seedlings and cuttings in nurseries.

Avenues.—The energies of the arboriculture establishment under the direction of the Board, have been devoted principally to preserving existing trees on road-sides and supplying the gaps made by unfavorable seasons—thus about 60,000 feet of single lines of avenues are planted on an average yearly; and in filling up blanks on road-sides.

The following are the new lines of roads on which trees were planted:—

		Trees.	
In 1884-85	Amritsar-Ferozepore road to Chabhal, 10 miles ...	2,750	
In 1885-86	Kathunangal Railway feeder, Amritsar-Pathankot line	400	
	Jaintepura ditto ditto ...	100	
	Attari-Ajnala 20 miles to complete remaining miles	225	
	Jandiala-Vairowal road	160	
	Tarn Taran-Jandiala road	190	
	Cattle fair road	100	in 1886-87.
	Road to Amritsar Jail	140	
	Jhandiala-Vairowal road	100	
	Tarn Taran-Jhandiala road	150	

About 1,500 kikar plants of spontaneous growth are to be found yearly on road-sides. These are tended and cared for and become part of the round avenues.

Groves.—It is intended to sow the encamping-grounds with kikar seed in trenches along their outer superficies except an opening on one side, at a very small cost, for it is difficult to raise to maturity any tree except the kikar without the expense of keeping up a special watering establishment. The kikar thrives admirably in this District and produces a useful timber.

Future plan of operation.—There is much new work to be done on roads, but for want of funds nothing more can be done for some time to come. The Board's attention is at present devoted to the two lines of road, on which planting operations commenced in 1885-86 as shown above *viz*—

Jhandiala-Vairowal road, 13 miles.
Tarn Taran-Jhandiala road, 10 miles.

When these are completed other new lines will be taken in hand.

Fodder trees.—The special cultivation of trees for fodder purposes is not carried out to any great extent in this District. The District in parts abounds in fodder trees, such as the siris, ber, kikar, farash, pipal and shisham, the leaves of which cattle and goats eat, but during seasons of drought, the fodder which these trees would produce would not suffice for a week's consumption for all the cattle in the District.

Owing to the large area irrigated by the Bari Doab Canal, the zamindar naturally thinks more of producing ordinary crops, and it is useless pointing out to him that on certain land the cultivation of trees should in the end be more remunerative than many crops. The rearing of trees receives but little attention from agriculturists though they are offered plants gratis.

Financial results.—The receipts for the three years under review have been as under:—

	1884-85.	1885-86.	1886-87.	TOTAL.
	Rs.	Rs.	Rs.	Rs.
Ornamental gardens	...	35	46	81
Nurseries	10	15	15	40
Avenues and Groves ...	1,385	3,121	1,934	6,440
Total Rs. ...	1,395	3,171	1,995	6,591

Income.—From the above it will be seen that the receipts have grown considerably, particularly in the year 1885-86 when the storms uprooted heavy trees to number of about 80 or 90 on District roads; these realized Rs. 950 and thus swelled the income. The usual receipts are from sale of decayed trees and fallen timber on road-sides, tree-loppings, compensation awarded by Courts for injury of trees, sale of fruits, &c. I may here mention that the supervision of the lopping of road-side trees is now generally entrusted to men specially trained in the work of pruning and thinning of timber, who do not cut down wholesale, in a merciless manner, trees for the sake of income, nor lop them so that they become mutilated and eventually die.

Expenditure.—The following table shows the expenditure during the last three years:—

	1884-85.	1885-86.	1886-97.	Total.
	Rs.	Rs.	Rs.	Rs.
Ornamental gardens	...	...	416	416
Nurseries	580	1,279	641	2,500
Avenues and Groves	7,320	7,919	8,011	23,250
Total Rs. ...	7,900	9,198	9,068	26,166

3 average Rs. 8,722.

The allotment for 1886-87 for arboriculture was Rs. 1,000, from District funds for maintenance of trees on road-sides, supplemented by a grant of Rs. 1,032 from Provincial funds on account of maintenance of trees in Civil lines; these latter have been transferred from 1st April 1887 to the Municipality. The expenditure amounted to Rs. 9,068 or Rs. 36 in excess of grant, and was met from savings under other heads of account District funds.

The above shows that the expenditure has also increased during the past two years and the results recorded below appear commensurate with the expenditure incurred. As might be expected, avenue planting and tending road-side trees were the works on which the District arboriculture establishment was principally employed. Also new nurseries were opened and new lines of road-planted, as detailed above.

LAHORE DIVISION.

General remarks.—Rainfall.—The rain-fall was scanty as will be seen from the following table in which the fall in the district during each of the past three years is compared with the fall during the preceding 3 years :—

District.	1881-82.	1882-83.	1883-84.	1884-85.	1885-86.	1886-78.
Lahore	18·2	22·4	19·8	12	14·9	12·5
Average	...	20·1	...	...	13·1	...

In the annexed table the rainfall in each of the 4 tahsils during the past 3 years is given :—

Tahsil.	1884-85.	1885-86.	1886-87.
Lahore	19·4	22·2	20·8
Kasur	10·1	15·5	18·4
Chunian	6·9	9·5	4·5
Sharakpur	11·8	12·7	10·6
Average Lahore District	12	14·9	12·5

It will be seen that the Chunian tahsil has been the worst off. The rains too were not always seasonable.

Calamities.—No calamitous events, such as hail-storms, fire, hurricanes, &c., causing extensive injury to trees, occurred. Nor have any complaints of whiteants having destroyed

young or living plants been received. The reports of all the Tahsildars on the condition of the avenues, groves and nurseries under their care are fairly satisfactory, more so than they have been in previous years.

Road-side avenue planting and tending road-side trees were the works on which the district arboricultural establishment was principally employed. The formation of new nurseries and planting of road-side groves of shelter-giving trees is also receiving due attention

Description of work.—Avenues.—To come to facts and figures. During the past 3 years a total length of 33 miles 3 furlongs and 20 poles of avenue has been added to the roads in the district, the following description of trees being principally used, *viz.* shisham, tut, mango, farash, jaman, pipal, siris and kikar. More shisham was planted than any of the other kinds.

This, however, does not include tree-planting operations within Municipal limits carried on by Municipalities.

The operations of Municipalities are shown separately in the returns submitted. The following abstract shows the lengths added in each of the 4 tahsils :—

Lahore	13 miles	and 18 poles.
Kasur	4 ditto	1 furlong and 23 poles.
Chunian	5 ditto	and 4 furlongs.
Sharakpur	10 ditto	7 furlongs and 19 poles.

The amount of work done compares favorably with the results obtained in the preceding 3 years. Considering the result, I think a fair amount of attention has been given by Tahsildars to road-side tree planting. The establishment in all 4 tahsils were also employed in filling up gaps in existing avenues and tending and watering the young plants put down in the length added during the past 3 years.

It is not necessary to recapitulate here the work done in each tahsil, as the statements which have been submitted in this and in the two previous years show in great detail the whole operations year by year up to the year 1886-87. From the avenue progress statement it would appear that about ⅔rds of the roads in the district yet remain to be planted with avenues. I am inclined to believe that the proportion is greater. It is hopeless, of course, to expect that the whole length of all district roads will eventually have avenues planted on them

Nurseries and groves.—In Tahsil Lahore new nurseries have been planted at Baddo, Barth, Dugaich and Shahdera. No new groves were however planted during the past 3 years.

In Sharakpur new nurseries were formed during the year 1886-87 near Mángtanwala and Sheikhupura roads. The nurseries at these places supply all local wants. In Kasur new nurseries have been opened at Gharyala Bopo Rai, Kulla, Rukhanwala and Valtoha. The plantings are reported to be flourishing. The Tahsildar reports that new groves have been planted at a cost of Rs. 140 during the year 1886-87 near the Luliani encamping-ground, and 50 trees have been planted in the encamping-ground at Kasur to replace those that died off.

In Chunian a new nursery was formed during the year 1886-87 at the side of the Changa Manga road. New groves were also formed during the years 1885-86 and 1886-87 near the encamping-grounds at Chunian and Bhai Pheru.

Establishment and supervision.—The Sub-Overseer at each of the tahsils supervises all planting operations in addition to performing his own duties. The following is an abstract of the detailed statement of establishment employed and their cost during the past 3 years :—

Tahsil.	Establishment.			Cost.		
	1884-85.	1885-86.	1886-87.	1884-85.	1885-86.	1886-87.
				Rs.	Rs.	Rs.
Lahore	12 men	11 men	11 men	375	681	663
Chunian	15 „	9 „	5 „	482	401	205
Kasur	9 „	9 „	12 „	675	527	690
Sharakpur	15 „	10 „	11 „	391	336	488
Total ...	51 men	39 men	39 men	1,923	1,945	2,046

Reference to the detailed statement of expenditure will show that out of the totals of Rs. 3,500, 2,930 and 2,987 expended during the past 3 years, Rs. 1,923, 1,945 and 2,046 were paid to the establishment respectively.

Financial results.—In the following table the income and expenditure for the past 3 years are compared :—

Tahsil.	Income.			Total Expenditure.		
	1884-85.	1885-	1886-87.	1884-85.	1885-86.	1886-87.
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Lahore	104	92	121	1,618	1,221	1,004
Kasur	...	81	125	675	620	917
Chaniana	106	49	33	547	466	360
Sharakpur	601	39	172	660	623	706
Total	811	261	451	3,500	2,930	2,987

The increased income during the year 1884-85 is due to the fact that the income from sale of fallen and dead trees was abnormally large in the Sharakpur tahsil that year.

Concluding remarks.—I would in conclusion mention that it is difficult to review the results of the years planting operations when these are expressed in the forms prescribed in *feet, vide* progress statement for 1886-87. The total length of roads in the Lahore District is shown to be 17,43,443 feet, the total length of avenues planted 5,63,592 feet. To comprehend these swollen and therefore unmeaning figures, it is necessary to convert them into yards, poles, furlongs and miles : and to do this at every step is very inconvenient. The lengths should be shown in miles, furlongs &c.

16.—JHANG DISTRICT.

General remarks.—It is evident that owing to scanty rainfall in the past three years the results in connection with tree-planting were not good. Arboriculture generally failed on this account, hence no detailed report is sent. Measures will be taken towards the improvement of this scheme, this season, if the weather is favourable.

MONTGOMERY DIVISION.

17.—MONTGOMERY DISTRICT.

	Tahsils.		1885-86.		1886-87.
General remarks.—Rainfall.—	Montgomery	...	8·3	...	8·9
	Gugera	...	8·3	...	6·9
	Dipalpur	...	8·0	...	8·0
	Pakpattan	...	7·5	...	9·0

or for the whole District 8·2, 8·8, which is considerably less than the average calculated on the last 5 years which is :—

1885-86.	1886-87.
10·54 ..	10·7

and is not sufficient for arboricultural operations.

In this District whitcants are very destructive and do a great deal of damage.

Description of work.—Avenues.—Total length of avenues planted during 1885-86 amounted to 1,000 feet. No avenues were planted during the year under report. Trees planted to the extent of 3,050 feet in single straight lines failed during the year, against 2,430 feet in the preceding year. The increase in the number of failures is due to scanty and unseasonable rainfall. The work done during the present year 1886-87 consisted of replacing dead trees with fresh ones wherever required, and protecting young and delicate trees from frost, by covering them with grass during the very cold months.

The percentage of trees successfully planted during the past three years was about 50.

A large portion of the roads in this district remain unplanted owing to the bad quality of soil and to scarcity of water along the road-sides.

Groves.—Total area of groves existing in this District at the end of the year under report was 31 acres, against 28 acres the preceding year. The groves at Gugera and

Attari consist of old and large trees and require no particular care. At other places the plantations are young and require some looking after.

The kinds of trees sown or planted are generally kikar, ber, shisham, mangoes and a few other fruit trees.

Nurseries.—No special areas were set apart for nurseries, but small plots in gardens were kept stocked with cuttings and young plants for the purpose of replacing dead trees on roads, &c.

Establishment and supervision.—The following establisment was maintained during the year and the expenditure thereon amonted to Rs. 1,055 as follows:—

Ornamental gardens.

			Rs.
1	Carpenter	@	10
1	Mali	,, ...	6
2	Coolies	,, ...	5 each.
1	Do.	,, ...	3
1	Blacksmith	,, ...	2-8

Montgomery Tahsil.

Avenues and groves.—Contractor for watering trees at Chichawatni @ Rs. 10 per mensem.

Gugerah Tahsil.

			Rs.
1	Mali	@	10
1	Do.	,, ...	8
3	Coolies	,, ...	5 each.
1	Do.	,, ...	3

Contractor for watering trees at Okarah @ Rs. 5 per mensem.

Dipalpur Tahsil.

Contractor for watering trees at Dipalpur @ Rs. 10-0-0 per mensem.

The establishment at the Station garden worked under supervision of the Secretary District Board and the Deputy Commissioner, and those in tahsil under that of the Tahsildars.

Financial results.—The following table shows the expenditure, income and net cost of arboricultural operations in this District during the past three years :—

Years.	*Expenditure.*	*Income.*	*Net cost.*
	Rs.	Rs.	Rs.
1884-85 ...	3,546 ...	724 ...	2,822
1885-86 ...	5,750 ...	463 ...	5,287
1886-87 ...	6,065 ...	949 ...	5,116

The increase in expenditure during 1885-86 and 1886-87 is chiefly due to the purchase of bullocks to replace several old animals that died and also to the purchase of a Pulsometer Pump for supply of water in the Station garden.

MOOLTAN DISTRICT.

General remarks.—The annexed table will show the average rainfall for the last 3 years and the year under report :—

Tahsil.	1883-84.	1884-85.	1885-86.	1886-87.	Remarks.
Mooltan	6·2	7·7	9·7	5·3	
Shujabad	5·1	8·2	7·9	4·4	
Lodhran	2·6	7·1	4·4	2·2	
Mailsi	4·4	4·8	6·9	3·0	
Sarai Sidhu	4·3	7·7	2·5	0·9	
Average	4·5	7·1	6·3	3·1	

Thus the average rainfall for the district has been the lowest within the last four years. Rainfall has been gradually decreasing since 1884-85, and this decrease has been very injurious to trees and is one of the main reasons why there are so few trees on the roads in the district.

There is great difficulty in keeping trees alive on the road-sides—the rainfall is so small and the water so far from the surface that trees of five and six years of age die at once, unless regularly watered. The cost of watering is so great that operations must be limited.

A large nursery and grove is being prepared now on the Sidhnai canal land,—Government having allowed 45 acres to be taken for the purpose. The first cost of starting will be about Rs. 1,000. Extensive planting is being done now on the roads within the influence of the above canal.

Description of work.—The following avenues were planted during the last three years:—

	1886-87.	1885-86.	1884-85.
	Feet.	*Feet.*	*Feet.*
Mooltan to Bandarghat ...	5,020	20,624	8,000
Do. to Jalalpur *vid* Shujabad	2,900	...	17,660
Shujabad and Basti Maluk road	...	...	3,060
Shujabad town and Railway station road	2,339	520	2,859
Mailsi and Tibba road ...	2,910	6,472	3,660
Mailsi and Jum Thal road ...	2,310	582	1,900
Mailsi and Kabror road ...	2,430	2,551	2,060
Jalalpur and Kabror road ...	4,475	10,050	...
Tibba and Karampore road...	...	2,461	...
Road round the city of Mailsi	...	3,467	...
Shujabad and Lodhran road	3,100	...	...

From this it will be seen that most work has been done on the Bandarghat road and on the road between Jalalpur and Shujabad. These avenues are maintained by the owners of wells on the road-side and they are paid at a rate varying from 3 pies to 6 pies per tree per month. In the Lodhran tahsil a special establishment is kept up for watering trees.

Groves.—No new groves were planted during the last three years; the existing groves are mentioned in the statement sent with the report; they occupy an area of 49 acres 2 roods 17 poles.

Nurseries.—17 marlas of land was planted with shisham, siris, bohar, and pipal trees as a nursery in the gardens at Mailsi, Karor, and Lodhran.

Establishment.—The following establishment is maintained for the avenues and nurseries in the District :—

1 jamadar @ Rs. 10.

5 gardeners @ „ 7 each—
- 1 gardener at Lodhran.
- 1 „ at Mailsi.
- 1 „ at Sarai Sidhu.
- 1 „ at Shujabad.
- 1 „ at Pakhi Mian.

5 gardeners @ Rs. 6 each—
- 2 gardener at Tahsil Mooltan.
- 2 „ at „ Mailsi.
- 1 „ at „ Sarai Sidhu.

8 gardeners @ Rs. 5 each—
- 1 gardener at Lodhran.
- 1 „ at Kahror.
- 3 „ on the roads in Lodhran.
- 1 „ at Tibba.
- 2 „ in Sarai Sidhu.

1 boy @ Re. 1-8 per mensem at Malsi.
1 „ 8 anas per mensem at Faridkot.

The men paid at Rs. 10 and Rs. 7 generally supervise the road-side trees and look after the nurseries at head-quarters of the Tahsils.

Financial result.—The total charges on arboriculture during the 3 years under report have been shown in the annexed table—

	1884-5.	1885-6.	1886-7.	TOTAL.
	Rs.	Rs.	Rs.	Rs.
Establishment	4,633	4,769	4,080	13,882
Feed of bullocks	4,583	4,692	5,040	14,515
Purchase of seed	697	182	234	1,113
Miscellaneous including payment by results	813	1,200	600	2,613
TOTAL.	10,726	10,843	9,954	3,523

The income during the last 3 years from the various sources is given below :—

	1884-85.	1885-86.	1886-87.	TOTAL.
Gardens	1,950	1,844	1,808	5,602
Nurseries	4	1	3	8
Avenues and groves	773	879	1,964	3,616
Afforested waste	...	...	16	16
TOTAL.	2,727	2,724	3,791	9,242

Thus there has been a deficit of Rs. 22,281 during the last 3 years.

RAWALPINDI DIVISION.

19.—RAWALPINDI DISTRICT.

Rainfall.—Since 1884-85 the rainfall has been insufficient. In 1885-86 there was a marked decrease, and in 1886-87 it was so inadequate that a drought prevailed during the last six months of the year in several localities, but it was most severe in the western portion of the district comprising the Fatehjang and Pindigheb tahsils.

The rainfall in the three years in the different tahsils is shown in the subjoined table :—

	1884-85.		1885-86.		1886-87.	
Tahsils.	*Inches.*	*Tenths.*	*Inches.*	*Tenths.*	*Inches.*	*Tenths.*
Rawalpindi ...	37	8 ...	85	5 ...	15	4
Fatehjang ...	32	2 ..	19	0 ...	13	1
Pindigheb ...	16	8 ...	18	5 ...	5	8
Gujarkhan ...	34	4 ...	18	6 ...	12	5
Attock ...	20	7 ...	24	8 ...	6	1
Kahuta ...	55	3 ...	38	6 ...	15	6

Description of work.—Avenues.—The arboricultural operations are limited to the plain part of the district consisting of part of the Kahuta tahsil, and the Rawalpindi, Fatehjang, Pindigheb, Gujarkhan and Attock tahsils.

Notwithstanding the scarcity of rain a good deal has been done in tree-planting during the three years.

Gaps in avenues were either filled up or the avenues were extended on 41 roads in 1884-85, on 47 roads in 1885-86 and 39 roads in 1886-87.

The number of miles on which operations were carried out in each tahsil was as noted below :—

Rawalpindi Tahsil	...	36	miles.
Fatehjang „	...	9	„
Pindigheb „	...	3	„
Attock „	...	3	„
Gujarkhan „	...	10	„
Kahuta „	...	30	„

In all 1,24,424 trees were planted, of which 63,199 failed and 61,225 were established.

The number of trees planted in each tahsil is given in the subjoined table :—

TAHSIL.	1884-85.			1885-86.			1886-87.			TOTAL.		
	Planted.	Failed.	Established.	Planted.	Failed.	Established.	Planted.	Failed.	Established.	Planted.	Failed.	Established.
Rawalpindi	11,712	9,680	2,032	12,832	11,593	1,239	3,047	2,493	554	2,759	123,766	3,825
Fatehjang	2,325	1,230	1,095	3,409	1,325	2,084	1,260	350	910	6,994	2,905	4,089
Pindigheb	1,184	373	811	850	...	850	1,010	24	986	3,044	397	2,647
Attock	2,257	402	1,855	514	...	514	1,712	56	1,662	4,483	452	4,031
Gujarkhan	29,389	11,951	17,438	19,428	17,425	2,003	..	...	.	48,817	29.376	19,441
Kahuta	5,600	4,450	1,150	3,034	1,173	1,861	24,861	680	24,181	33,495	6,303	27,192
Total ...	52,467	28,086	24,381	40,067	31,516	8,551	31,890	3,597	28,293	1,24,424	63,199	61,225

Result.—The operations in the Kahuta tahsil have been extensive and successful. Of the large number of trees planted 81 per cent. were established. This is the only tahsil in which arboriculture can be carried on with advantageous results, the climate and soil being well suited for tree-planting. In the Gujarkhan tahsil a large number of trees were planted, but of these only 39 per cent. were established. In this tahsil the rainfall is usually sufficient, but the soil is not suited for tree-planting. In the Rawalpindi tahsil also a comparatively large number of trees were planted, of which, however, 20 per cent. only have thriven. This is an average tahsil for tree-planting. In the Fatehjang, Pindigheb and Attock tahsils the number of trees planted was small, but a comparatively large number succeeded, being 58 per cent. in Fatehjang, 86 in Pindigheb, and 89 per cent. in Attock. In Ilaqua Sohan of the Fatehjang tahsil and Ilaquas Chach and Huzro of the Attock tahsil, trees can be propagated without difficulty. In the Pindigheb tahsil the climate is hot, rainfall scanty and ground hard.

It must also be borne in mind that the planting on the road-sides is carried on in this district almost entirely though the agency of the zamindars. In only a few special localities is an establishment for watering such trees maintained.

In addition to the trees planted on roads, 2,968 were planted in the vicinity of tahsils, school houses, dispensaries and other public buildings in 1884-85, 2,898 during 1885-86 and in 1886-87 1,400.

Fodder trees.—In the villages at the foot of the hills in the Rawalpindi tahsil, 700 trees suitable for fodder have been planted, such as daman, khooa and koliar. But where grass is not obtainable, cattle eat freely the leaves of the shisham, mulberry, bakain and ber, which are largely planted on road-sides and in groves.

Groves.—There are 1,003 groves on an area of 390 acres 2 roods 12 poles; of this land 192 acres 1 rood 26 poles, which was omitted from former statements, has now been entered.

Arrangements for purchase of land, owned by zamindars under groves.—Of the total area 175 acres 3 roods 16 poles are owned by zamindars. On this land there are 923 groves.

As it appeared most desirable that these groves should be conserved and maintained and this could only be done by purchasing out the rights of the zamindars in the land Colonel R. P. Nisbet, Deputy Commissioner, arranged for the purchase of the land by the District Board, and at a meeting of the Board held on the 25th October, 1886, a sum of Rs. 6,000 was sanctioned by the Board for payment to the zamindars as compensation for the land under the groves.

Nurseries.—The area set apart for nurseries is 18 acres 1 rood 39 poles, of which 4 acres 2 roods 30 poles are planted. Two additional poles were planted, one failed; there was consequently an area of 4 acres 2 roods 31 poles of established plants at the end of 1886-87.

These nurseries of forest trees are intended for road-sides and groves.

Gardens.—Fruit trees.—There are six public gardens in the District which are maintained for the propagation of fruit trees and flowers.

These gardens are at Rawalpindi, Chuttar (on the Rawalpindi and Murree road), Hasanabdal, Fatehjang and Pindigheb.

During the past three years they have been stocked with 3,102 fruit trees obtained from the Botanical gardens at Saharanpur and Lahore, or raised in the gardens; and 2,419 fruit trees have been distributed to zamindars and other private individuals.

A detail of the trees stocked in the several gardens and distributed from each is given in the following table:—

Year.	Number stocked in the garden of.							Number of fruit trees distributed to zamindars and other private individuals.
	Rawalpindi.	Selah or Chuttar.	Hasanabdal.	Fatehjang.	Gujarkhan.	Pindigheb.	Total.	
1884-85 ...	300	59	288	...	...	59	706	630
1885-86 ...	500	...	260	7	149	...	916	258
1886-87 ...	420	250	670	60	40	40	1,480	1,531
Total	1,220	309	1,218	67	189	99	3,102	2,419

Formation of nursery for English fruit trees.—English apple and pear trees have been distributed to zamindars of the Murree tahsil and are doing well. The climate and soil of this tahsil and a large part of the Kahuta tahsil are well suited for the production of European fruit. Arrangements have accordingly been made for the formation of a nursery for European fruit trees for these tahsils at "Charra Pani" on the Rawalpindi and Murree road some 10 miles below Murree. The land has been rented and laid out, and English apple, pear, cherry and other fruit trees have been obtained for the nursery from the Government nursery at Naini-Tal, and will be planted as soon as the rains set in.

Financial results.—The total income from all sources during the 3 years was Rs. 7,866, and expenditure Rs 11,925.

Trees planted in Municipalities.—In the Municipalities of Rawalpindi, Huzro and Pindigheb 1,039 trees were planted.

By zamindars.—A large number of trees have been planted by zamindars at wells, tanks and musjids.

20.—JHELUM DISTRICT.

General remarks.—The average rainfall in the District during the last three years was—

1884-85	...	21 inches.
1885-86	...	23 ,,
1886-87	...	14 ,,

In Pind Dadan Khan tahsil rain was scanty in all three years under report, and in Chakwal and Talagang; in the last of the three arboricultural operations were in consequence retarded.

Description of work.—The following table shows the progress made in tree-planting during the three years :—

Tahsil.	Year.	Road-sides.	Gardens.	Avenues in yard.
Jhelum	1884-85	3,050	235	7,100
	1885-86	1,870	350	4,000
	1886-87	2,200	171	760
Pind Dadan Khan ...	1884-85	1,450	155	405
	1885-86	625	80	6,680
	1886-87	383	...	6,580
Chakwal	1884-85	20	55	...
	1885-86	200	...	...
	1886-87	100	...	...
Talagang	1884-85	336	194	...
	1885-86	1,672	...	...
	1886-87	80	171	...
Total ...	1884-85	4,856	639	7,505
	1885-86	4,367	430	10,680
	1886-87	2,763	342	7,340
GRAND TOTAL ..	...	11,986	1,411	25,525

The arboricultural operations were carried on on an extensive scale in Tahsil Jhelum in 1884-85 and 1886-87, but in 1885-86 in the three most favorable months for tree plantations, *viz.* July, August and February, the want of rain much hindered the work. The working in other three Tahsils is fairly good in proportion to the establishment at their disposal.

During the last three years 38,922 trees were planted, of which 6,541 or 16·80 per cent. died.

The loss being less than one-fifth is not extraordinary, considering the season.

100 trees in Tahsil Chakwal and 80 in Talagang, planted during 1886-87, dried up from want of rain which was only 11 and 12 inches respectively in these Tahsils.

30,360 feet more of road lines were stocked with plants in 1886-87, while the loss by failures or destruction of trees was much less, being in 3,880 feet only.

In pruning proper care was taken. Only such portions and branches were lopped as were deemed obstructive to the growth of the trees. The young trees were protected by fences made of kikar tree loppings; and were watered in the prescribed manner, that is, earthen pots were buried at the root of the trees and filled with water.

In the Jhelum Tahsil plants were mostly obtained from the District nursery at Beli Pira Ghaib; the Forest Department also contributed a small number.

In all the other Tahsils they were transplanted from the small preserves maintained along the road-sides for the purpose.

Species of trees planted —The sisso, dhareg, mulberry and kikar trees were chiefly planted, but the soil of this district is most congenial to the sissoo.

Cuttings of fruit trees, such as alucha, loquat and apricot were planted in the gardens at Jhelum, Sheikhupura, Chakjamal and Choya Saiden Shah, and apple at Pind Dadan Khan, in addition to the above. They are all in a flourishing condition.

Nurseries.—Two roods more were stocked with cuttings of trees this year. The nurseries at Choya Saiden Shah and Pongra are favorably situated near water and are in good condition.

Establishment.—The establishment for arboricultural operations consists of—

1	mali	@	Rs.	25	per mensem.
1	do.	@	„	15	„
2	do.	@	„	10	„
1	do.	@	„	9	„
1	do.	@	„	7	„
1	coolie	@	„	6	„
29	do.	@	„	5	„
1	do.	@	„	4	„
1	pakhalis	@	„	12	„
3	do.	@	„	7	„
1	do.	@	„	6	„
2	bhistis	@	„	5	„
1	do.	@	„	1	„

Financial results.—The following comparative table shows the income and expenditure of the arboricultural operations for the last 3 years. The result is a deficit of Rs. 14,157. This is larger than it would probably have been but for the unfavorable seasons.

Tahsil.	Years.	Receipts.			Expenditure.			
		Garden.	Tree loppings and dead trees.	Total.	Garden.	Nurseries.	Planting road-side trees.	Total.
Jhelum ...	1884-85	109	487	596	2,129	275	1,462	2,866
	1885-86	285	519	804	3,081	439	1,211	4,731
	1886 87	210	523	733	2,330	293	1,191	3,814
Pind Dadan Khan	1884-85	123	55	178	448	490	...	938
	1885-86	103	137	240	268	180	176	624
	1886-87	359	190	549	359	238	196	793
Chakwal ...	1884-85	103	51	154	485	128	168	781
	1885-86	77	55	132	391	95	157	643
	1886-87	134	83	217	244	112	91	447
Talagang ...	1884-85	9	95	104	178	114	179	471
	1885-86	8	42	50	181	98	173	452
	1886-87	61	34	95	135	137	177	449
Total ..	1884-85	344	688	1,032	3,240	1,007	1,809	6,056
	1885-86	473	753	1,226	3,921	812	1,717	6,450
	1886-87	764	830	1,594	3,068	780	1,655	5,503
Grand Total ...	...	1,581	2,271	3,852	10,229	2,599	5,181	18,009

21.—SHAHPUR DISTRICT.

General remarks.—The rainfall of the year under report was much less than that of the previous year, being 10·7 against 15·4, and comparatively little could be done to extend the area under trees.

This year Dr. Henderson, who has kindly taken charge of arboricultural operations, is, notwithstanding the drought, making arrangements for extensive sowings of dates, mangoes and shisham, and for layers of vines, and I have had 250 acres belonging to Malik Umar Hayat of Kolra, sown with *shisham*, which is coming up very well.

Description of work.—The total number of trees planted during the year was only 1,164, out of which 343 died out, against 1,932 and 190 of the previous year,—drought being generally the cause of the failure.

Establishment.—The establishment kept up during the year was as follows:—

Road-side trees establishment.

		Rs.
13 beldars	@ Rs. 5 ...	65

Station gardens.

2 malis	@ Rs. 10 =		20
2 do.	„	6	12
2 do.	„	5	10
3 coolies	„	5	15
5 do.	„	4-8	22-8
1 do.	„	4	4
1 do.	„	2-8	2-8
Total ...			86

Gardens in Tahsils.

1 mali	@ Rs. 8 =		8
3 do.	„	7	21
1 do.	„	6	6
2 do.	„	5	10
1 do.	„	4	4
3 coolies	„	5	15
2 do.	„	4-8	9
1 do.	„	4-12	4-12
Total ...			77-12

Supervision.

	Rs.
1 Darogha arboriculture	25
1 Peon	5

Financial results.—The following is the statement of financial results for the year compared with the previous year:—

	1886-87.	1885-86.	Difference.
	Rs.	Rs.	Rs.
Income	3,607	2,967	+ 640
Expenditure ...	4,179	3,845	+ 334

The income of the year is derived thus—

	Rs.
Fruits	1,258
Plants	13
Grass	278
Thinning of groves and lines	2,013
Miscellaneous	45
Total ...	3,607

The expenditure of the year under report is made up of the following items:—

	Rs.
Pay of establishment of Station gardens	998
Ditto out Station gardens	927
Pay of Darogha and peon	309
Garden and arboriculture contingencies	697
Temporary Beldars	421
Subscription to Agri-Horticultural Society	120
Road-side trees establishment	707
Total ...	4,179

The income from sale of fruits is increasing, but is not so high as it ought to be with such a large establishment of gardeners. The result of former operations is now making itself felt in the increase of income from sale of thinnings. During the cold weather a considerable area of flourishing kikar groves near the Civil station and a portion of the line

line of trees along the Bhera-Shahpur road were thinned out to the advantage of the remaining trees. A grove of shisham on the bank of the Jhelum at Logari was threatened by the river and had to be cut down and sold.

22.—GUJRAT DISTRICT.

General remarks.—Nil.

Description of work.—Avenues.—Only those roads have been entered in the Avenue statement upon which arboricultural operations were in hand in 1886-87. This way of showing only such roads has been followed this year, as it is on the same principle as that observed in previous years. Shisham trees, especially in Gujrat Tahsil, have been planted out freely, fodder trees as a rule are not used for avenues in this district. Kikar trees grow and make good avenues. In the higher parts of the district there are some kikar avenues; and during the late (February and March 1886) fodder famine a good deal of fodder was derived from them; but the kikar is not so handsome nor is the timber so valuable as that of the shisham.

The thinnings were carried out under the special supervision of Mr. G. L. Smith, the Deputy Commissioner of this District, during the cold weather of 1886-87.

Income.—The income of the year is derived thus—

			Rs.		Rs.
Ornamental Gardens ...	Fruit	...	...	...	78
Avenues and Groves ...	Loppings	...	1,200		
	Thinnings	...	3,500		
	Dead trees		3,396		
	Grass	...	81	...	8,177
		Total		...	8,255

		1885-86.		1886-87.		
		A.	B.	A.	B.	
Expenditure.—	Ornamental Gardens ...	570	602	...	599	1,045
	Nurseries	60	240	...	180	180
	Maintenance and repairs	44	1,600	75	1,510	1,585
				Total	...	2,810

Total income for 1886-87 ...	Rs.	8,255
Total expenditure do. ...	,,	2,810
Surplus	,,	5,445

During this year the total income has been Rs. 8,255 and the expenditure Rs. 2,810, leaving a surplus of Rs. 5,445 to the credit of the District fund.

Groves.—No remarks are offered.

23.—GUJRANWALA DISTRICT.

This report has been compiled from statistics supplied by Tahsildars. I have as yet not had the opportunity of forming any opinion of my own as to the progress of arboriculture and the means adopted to carry out arboricultural operations in the District.

General remarks.—The following comparative table shows the rainfall for the last 3 years in each Tahsil :—

	1884-85.	1885-86.	1886-87.
Gujranwala	21·1	23·2	25·2
Wazirabad	25 4	20·8	17·9
Hafizabad	15·9	19·6	15·7

The year 1884-85 was favorable to arboricultural operations; while the years 1885-86 and 1886-87 were not so, owing, to some extent, to scanty but more so to unseasonable rainfall. No special calamity, however, occurred to injuriously affect arboriculture.

Description of work.—As will be seen from the fignres given below, very little work in the shape of the planting of new roads or portions of the same was done; the operations having been confined chiefly to the filling up of gaps and blanks on roads already planted and to the maintenance of avenues.

In 1884-85 the following roads were planted during the year :—

(1) Gujranwala to Shekhupura 1 mile with 284 trees.
(2) Gujranwala to Dinanagar 1 ,, ,, 325 ,,
(3) Wazirabad to Dhaunkal 1 ,, ,, 275 ,,

Besides 4,393 trees were put out on various roads to fill blanks and gaps.

In 1885-86; 1 mile of road from Sheikhupura to Kadrabad was planted during the year with 30 trees and 4,667 trees were planted on other roads to fill up gaps.

In 1886-87, 2,012 trees were planted on 4 miles of road from Gujranwala to Khanga *viâ* Kila Mian Singh and 1,400 trees on road from Wazirabad to Dhaunkal. In addition 2,050 trees were planted out to fill up blanks. No trees were specially planted for fodder.

Small nurseries have been planted at short distances from the roads where means of water supply are available, and small payments are made to zamindars for the maintenance of the same.

Method of planting.—Seedlings from 2 to 4 feet high are removed from nurseries and planted out it the spring as also in the rainy season, and are protected by bramble fencing, as also, in some places, by mud walls. In parts, however, where the soil is good, seed is sown in drills, and the plants carefully watered till sufficiently high to be independent of artificial irrigation. Shisham and kikar are found most suitable for planting out on road-side.

Lopping.—Lopping is carefully carried out with a view to injury to trunks of trees being avoided. No rare trees or plants were received for experimental cultivation.

Establishment and supervision.—The following establishment is kept up for protection and maintenance—

Name of Tahsil.	*Name of road.*	*Establishment.*
Gujranwala	Gujranwala to Amritsar	6 bhistis on Rs. 4 per mensem each.
	Ditto Ramnagar	3 ditto ditto.
	Ditto Sialkot	3 ditto ditto.
	Ditto Batala	2 ditto ditto.
	Ditto Hafizabad	1 ditto ditto.
	Ditto Shekhupura ...	12 ditto ditto.
	Ditto Khiali	2 ditto ditto.
	Ditto Nanshera	1 ditto ditto.
	Ditto Dinanagar	1 ditto ditto.
	Ditto Khanga-Dogran ...	10 ditto ditto.
Wazirabad	Encamping ground, Wazirabad ...	1 ditto ditto.
	Sarai Ghakhar	1 ditto ditto.
	Wazirabad to Ramnagar	4 ditto ditto.
	Ditto to Dhaunkal	2 ditto ditto.
	Dâk Bungalow, Wazirabad... ...	1 ditto 2 per mensem.
Hafizabad	Hafizabad to Gujranwala	7 ditto 4 ditto.
	Sheikhupura to Gujranwala ...	2 ditto ditto.

Besides the above establishment there are 2 jamadars on Rs. 10 per mensem each employed in the Gujranwala ; 1 jamadar on Rs. 6 per mensem in the Wazirabad, and 1 jamadar on Rs. 6 per mensem in the Hafizabad tahsils to supervise the work of bhistis.

Financial result.—The following table shows the income and expenditure during the past 3 years :—

Year.	*Income.*	*Expenditure.*	*Deficit.*	*Surplus.*
1884-85 ...	940	4,194	3,254	...
1885-86 ...	1,031	4,451	3,420	...
1886-87 ...	1,045	6,046	5,001	...

24.—SIALKOT DISTRICT.

The transfer from the Provincial Service to the District Board of 50½ miles of road from Wazirabad towards Gurdaspur, has caused an addition to the total number of miles of avenues in the District as shown last year.

General remarks.—Rainfall.—The rainfall of the year, though above the average, was not seasonable. There was good rain in June, July and August, and a great deal of tree-planting was done, but the want of sufficient rain in the following months resulted in the loss of a large number of young trees. Again during the winter planting season there was little or no rain and much work in the way of tree-planting could not be undertaken. The year was therefore on the whole an unfavourable one for arboriculture.

Injury by storms, &c.—Much damage was done to trees by storms. A large number were blown down during the monsoons and again in November and December. Unusual frost towards the close of the winter caused injury to young plants, especially to the mangoes which were planted along the Sikhund and at other places. I am sorry to note that a number of young plants on road-sides were pulled up by zamindars. Some cases in the Zufarwal and Sialkot tahsils, in which the delinquents were discovered, have been prosecuted. Much injury is done by shepherds and goat-herds who lop branches from trees to feed their sheep and goats on ; many of them have been prosecuted and punished. Cattle found trespassing on the roads are also sent to the pound.

Description of work.—Filling up blanks in, and the maintenance of existing avenues was the principal work of the year.

The nurseries have been replenished and well looked after. They will provide a large number of young trees suitable for planting on road-sides this year. In some of the mangoe nurseries which were covered with straw during the winter, much injury was done by field rats.

Encamping-grounds.—The mangoe plantations at encamping-grounds are in a generally thriving condition, and it is hoped they will soon begin to give some return for the money spent on them.

Financial results.—The following is a comparison of the financial results of the year under report with the preceding one :—

Source of Income.	1885-86.	1886-87.	Loss.	More.
	Rs.	Rs.	Rs.	Rs.
1. Gardens	1,934	2,333	...	399
2. Sale of dead trees ...	5,588	9,930	...	4,342
3. Thinnings	...	481	...	481
4. Lopping	1,654	1,726	...	72
5. Roadside grass ...	502	390	112	...
Total ...	9,678	14,860	112	5,294
		Net increase ...		5,182
Expenses	7,404	7,625	...	221
Profit	2,274	7,235	...	4,961

Income from gardens.—The increase in the income from gardens is due to increased sale of plants and fruits. The grass in the district gardens was also sold for a good price to the Carabiniers.

Sale of dead trees.—There is a very marked increase in the income from the sale of dead trees. This is due to a great number of large trees having been blown down by storms, but it is also in a great measure due to good arrangements being made for the disposal of the trees, some of which have sold for as much as Rs. 25 each.

Loppings.—The income from sale of loppings is about the same as in the preceding. Pruning is rarely permitted now.

Thinnings.—It was found necessary to thin the avenues on two or three roads where the trees were very dense ; this was done by carefully weeding out the weakest and stunted trees and those which were obstructing the growth and development of others. These thinnings were sold for Rs. 481.

Sale of road-side grass.—The income from sale of road-sides grass has fallen off, and a further decrease may be expected in future years. The reason of this is that the District Board has strictly prohibited the grazing of cattle on road-sides and the scraping up of the grass with the native hoe or *khurpa*, and has only permitted the sale of the grass on the condition that it shall be cut with the sickle or *dantri*. The advantages that will result from this prohibition are two-fold, in the first place young plants will be less liable to injury from cattle and the grass will help to bind the earth of the berms and so lessen the cost of repairs.

DERAJAT DIVISION.

Remarks by Commissioner.

Bannu.—The progress of arboriculture in the Bannu District is not saistfactory. The fine avenues in existence were formed many years ago, but little success has attended subsequent operations in their proper maintenance and extension, though conditions, water and soil are favorable. In some parts of the district, such as the Mianwali sub-division, the Marwat upland and other similar tracts, where there is no water or only obtainable at a great depth or from a distance and the ground is hard, stony or sandy, the difficulties are naturally great, but even here indigenous trees and shrubs could be sown or where growing be protected ; no expenditure however is required in these localities till the more favourable ones are fully timbered. The establish-

ment of nurseries has not received much attention; at Nowrang, for instance, a dâk bungalow 15 miles from Bannu, there is a so-called garden; it has a well and running water is also available, and it could therefore be, with little trouble, stocked with any number of trees of all kinds including fruit-bearing ones; in the villages in the neighbourhood there are some good orchards.

The employment of an arboriculture overseer possessing some knowledge of the ordinary principles of the art, is a move in the right direction. For success, however, there must be a personal interest; trees will not grow by order or rule. It is useless expenditure planting shisham and other trees in localities where they cannot thrive.

Dera Ismail Khan.—Considering the character of the soil and climate of the Dera Ismail Khan District the Commissioner thinks very fair progress is made.

Muzaffargarh.—In Muzaffargarh, except in the Thal tracts, arboriculture presents little difficulty, soil being good and water near the surface.

Ber and jhand might be more extensively planted; they require little water and grow in the most arid tracts; the latter in some Thal tracts thrive very well, and would cover the country if not lopped and kept down by camels and goats. Both are fodder trees and the former gives a coarse fruit as well. In some parts Date trees would no doubt grow if sown during the rains; they are hardy; avenues would look well and the fruit be useful. Even in the most barren tracts, if the indigenous growth on the roadsides was protected, the bushes and trees would attain a respectable height and protect better kinds when sown.

15—MUZAFFARGARH DISTRICT.

Description of work.—Avenues.—During the three years under report 1,86,838 feet of road were planted out with trees of shisham and farash or tamarisk on both sides. Thus a length of 3,73,676 feet was planted with trees, mainly shisham. Ukaub or farash is only planted here and there where the soil is so bad as not to allow shisham trees to grow. On the whole the condition of the trees planted is good. The operations during these three years were carried out chiefly on roads— (1) Muzaffargarh to Aludewali in Muzaffargah tahsil and from Aludewali to Alipur in Alipur tahsil; (2) on the road from Muzaffargarh to Daeradinpanah; (3) on the road from Sanawan to Gujrat, and (4) on Railway Station roads.

The above will be seen from the following table:—

Name of road.	Muzaffargarh tahsil.	Alipur tahsil.	Sanawan tahsil.	Total.
	Feet.	Feet.	Feet.	Feet.
Muzaffargarh to Alipur	64,794	55,440	...	1,20,234
Ditto to Ahsanpur... ...	2,020	...	42,240	44,260
Sanawan to Gujrat	...	...	13,200	13,200
Railway Station roads	7,119	...	...	7,119
Taleri Garden to Khangarh road ...	1,000	...	...	1,000
Muzaffargarh to Rangpur	625	...	...	625
Station roads	400	...	...	400
Total ...	75,958	55,440	55,460	1,86,838

I.—Road from Muzaffargarh to Alipur.

The length of this road from Muzaffargarh to Alipur is 51 miles, but the trees are planted up to 54th mile towards Sitpur.

The trees on this road are in a very good condition. The soil from 18th to 20th miles proved an obstacle and farash could only be planted with success; leaving this, the road is planted on both sides with shisham trees as far as it is planted at all. Seven and a half miles of this road remain to be filled with trees, and this will be done by end of 1888-99. More than two hundred mangoe trees were planted in 1885-86 on this road near Khangarh; most of them died, but were replaced by Khangarh mangoe plants that are in good condition. Saifullah Khan of Khangarh afforded great help in their supervision and otherwise.

II.—Road from Muzaffargarh to Ahsanpur.

The soil on this road is of various kinds, 2,020 feet of road were planted out up to near railway line crossing it, and there is nothing but "tibbas" of sand between this and Mahmudkot. From Mahmudkot to Sanawan the soil is fair with "tibbas" of sand occurring here and there. The soil from Sanawan to Kotaddu is still better, with fewer

"tibbas" between. The part of the road between Kotaddu and Ahsanpur remains to be set out with trees.

The entire length of this road is 47 miles; out of this 34 miles of road have been planted with trees, including the sandy parts where no trees have been planted.

III.—Sanawan to Gujrat.

The length of this road is 13 miles. It was formerly a custom road and had a good line of trees one side. Gaps were filled up to the extent of 13,200 feet, and it is expected that the road will be entirely planted out with shisham trees during 1887-88 or 1888-89.

IV.—Railway Station roads.

These are two bits of road leading from Muzaffargarh town to Railway station. The entire length of 7,119 feet was filled up with shisham trees in 1885-86. The remaining three roads were filled up with trees where gaps occurred.

Groves.—There was only one new grove sown over an area of 1 acre 3 roods 36 poles near Rohillanwali in 1884-85.

From this trees were transplanted on the Alipur road, both in 185-86 and 1886-87.

The idea of having further plantations was abandoned as they were found comparatively of little use.

The present plantations are sufficient to plant trees on road.

Besides these 400 shisham cuttings were planted in Taleri, and 396 fruit trees besides. On Mithuwala well 100 shisham trees were planted. In the Church compound 26 Eucalyptus trees were planted; 400 shisham trees were planted in camping ground Kotaddu, and many have survived the attacks of grazing animals.

Income and expenditure.—The table given below will show the income and expenditure of the three years under report:—

Heads	Expenditure or Income for												1883-84.		
	1884-85.			1885-86.			1886-87.			Total.					
	Rs.	A.	P.	Rs.	A.	P.	Rs.	A.	P.	Rs.	A.	P.	Rs.	A.	P.
Income.															
Taleri garden	214	0	0	341	8	8	433	7	9	1,016	0	5	328	3	6
Miscellaneous	257	4	11	...	...	...	...	...	...	257	4	11	90	7	11
Lopping &c	633	9	1	487	6	6	828	13	0	1,949	12	7	134	6	1
	1,131	14	0	828	15	2	1,262	4	9	3,223	1	11	543	1	6
Expenditure.															
Contribution to A.-H. Gardens	120	0	0	120	0	0	120	0	0	360	0	0	240	0	0
Gardens &c.	3,316	2	1	2,374	3	7	2,813	4	6	8,503	10	2	2,016	14	0
Arboriculture &c, ...	1,690	0	0	1,086	0	0	804	6	8	3,580	6	8	3,620	6	2
	5,116	2	1	3,580	3	7	3,737	11	2	12,444	0	10	5,877	4	2
Roadside trees, Part II ...	4,615	4	0	4,356	14	10	4,630	3	1	13,602	5	11	2,921	2	1
Grand total ...	9,741	6	1	7,937	2	5	8,367	14	3	26,046	6	9	8,798	6	3

A slight increase in the income of Taleri gardens, on account of competition between contractors and planting of new fruit trees.

Miscellaneous income Rs. 257-4-11 was the amount of price of trees felled in Taleri gardens credited in 1884-85.

Lopping was done more extensively in 1886-87 than the previous years, but without any due supervision.

Expenditure.—Gardens.—The difference between the figures of three years is due to an embankment and repairs of the Bungalow in the Saleri gardens, Rs. 695 being spent on the bank and Rs. 95 on the Bungalow.

The establishment of the malis was reduced at the end of 1884-85. Thus Rs. 60 per mensem were more spent in 1884-85 on account of plantations.

This was reduced at the end of that year when the malis were dispensed with.

No remarks are required for expenditure concerning road-side trees.

Description of work.—Avenues.—During the year under report, road-side avenues were extended by 1½ miles, *i.e.* half a mile in the Dera Ghazi Khan and one mile in the Jampur tahsils—the road leading to Sheru being extended by half a mile and another additional mile being added between Jampur and Dera Ghazi Khan.

There would no doubt have been a good deal more to show in the way of extension of avenues in this year, but for the excessive heat during the setting season and scanty rainfall.

About 450 trees were planted on the extension of 1½ mile and about 1,500 to fill up gaps made by trees decaying or having been blown down by the prevailing high winds during the summer months.

These newly planted trees consisted of "shisham," "siris," "mangoes, "pipal" (ficus religiosa) and "eucalyptus." As reported in former years the shisham is about the only tree that is found to be "at home" in the soil of Dera Ghazi Khan, and yet this too needs careful watering until it has attained the height of about 8 or 10 feet, when little more tending is found to be necessary.

The "kikar" likewise is a very hardy tree, and as before remarked in previous years' reports, well adopted to the *kallari* soils of the district.

Groves.—The two mangoe groves, one on the Rajpur road (half way between Dera Ghazi Khan and Kot Chutta) and the other on the Batil road, are showing signs of better animation, and will, it is hoped, prove successful. While adverting to the growth and culture of mangoes, I cannot but remark that, when it is in view to augment groves by planting of mangoes the better or best descriptions of the seedling kind ought invariably to be set, as the care bestowed, if successful, would be far more satisfactory and even remunerative than those grown from an indiscriminate choosing of seed for the nursery.

Nurseries.—Of these there were 8 maintained during the year :—

3 on the Jampur section of the Rajanpur road ;
1 on the Sheru road ;
1 on the Sakhi Sarwar road ;
1 on the Dera Ismail Khan road ;
1 In the Katchery garden and
1 In the Government garden.

These nurseries are, as noted in the former years, maintained for the purpose of providing, for the most part, plants for road-side planting and are a great convenience to zamindars who are supplied with tree plants free of cost, and so encourage the spread of the growth of fruit-bearing trees.

Chhabri-kot-Haebat plantation.—Very little has been done towards extending the plantation this year, and it has been found almost impossible to canal irrigate more of the lands. This is the only means to render the soils of the district fertile by washing out the "kallar" or saline deposits.

Nurseries of fruit trees.—As in previous years these two nurseries have been maintained and are found indispensible. From them were distributed gratis to zamindars some 2,000 trees, the bulk of which were fruit trees—such as mangoes, peaches, limes, oranges, figs, vines and jamans. For the grafted peach there is always a very great demand, as this class of fruit trees suffers much from the extremes of climate and is evidently not suited to the soil of this district.

Trees in Station gardens.
(*a*) Katchcrry and Government gardens.

The gardens at Buzkushi and Khar are doing well and it is anticipated that each successive year will develope improvement of the number and variety of the different fruit trees planted there—more especially of the *imported* descriptions. Large numbers of trees are being planted out from these gardens on the Fort Munro hill, including the Lombardy poplar, eucalyptus, carob, almond, apricot and mulberry, which are found to succeed best.

(*b*) Gardens at Fort Munro.

Expenditure.—The expenditure from all sources (Municipal, District and Provincial) on arboriculture proper, and maintenance of gardens and road-side avenues, amounted to Rs. 8,442 as against Rs. 7,260 of the previous year.

Statements as prescribed are duly submitted.

General remarks.—The work of the year has been on the whole satisfactory, the more so when the fact is taken into consideration that many orchards are springing up in all directions, proving that the advantages that are to be derived from the collected growth of umbrageous fruit trees are beginning to be understood by the people.

Every effort will be made to introduce and naturalize hardy species of trees that will thrive in a dry and rocky country such as Fort Munro, and it is to be hoped that these efforts, if successful, will provide a means for the future spread of arboriculture on the sides of the ever bare Suleman Hills.

The contribution from Provincial Funds of Rs. 72 per mensem for arboricultural operations along the Dera Ismail Khan and Mithankot roads has been removed from the Budget for the current year. It is hoped that next year this amount may be again allowed as in previous years. Or otherwise it will be necessary to stop tree-planting along this, the main road of the district, altogether.

27.—DERA ISMAIL KHAN.

General remarks.—The average rainfall in this District during the past three year was as follows:—

		Inches.
Dera	...	7·8
Kulachi	...	5·4
Bhakar	...	8·7
Leiah	...	10·3
Tank	...	6·3

Description of work.—Avenues.—The following table shows the length of single lines planted on the roads during the past three years :—

Name of road.	Length of lines planted with trees.				Length of line on which trees were destroyed.				Length of line stocked with trees.
	1884-85.	1885-86.	1886-87.	Total.	1884-85.	1885-86.	1886-87.	Total.	
Dera and Tank ...	3,487	2,660	10,500	16,647	600	900	...	1,500	15,147
Leiah and Kalur ...	15,840	2,000	244	18,084	5,280	1,000	..	6,280	11,804
Bhakkar and Jhang ...	1,026	1,000	1,804	3,830	257	400	10,967	11,624	

Dera and Tank.—The length of this road is 44 miles or 2,32,320 feet. Of this a length of 16,647 was planted during the year under report and the two previous years. The trees now stocked on the remaining length, *viz.* 15,147, are in a flourishing state owing to the ample supply of water on this part of the road.

Leiah and Kalur.—A length of 18,084 feet was planted, of which a number of trees died on a length of 6,280 feet; the remaining trees are doing well.

Bhakkar and Jhang road.—The length of this road is 44 miles, but owing to a continued drought in the Thal (Cis-Indus) a large number of trees died.

Species of trees.—The species of trees suited to the District and planted on the roads are chiefly tamarisk and kikar.

Groves.— The area stocked with trees or plants is 8 acres.

Financial results.—The following table shows the result of arboricultural operations in this District for the past three years:—

	Income.				Expenditure.				Total.
	1884-85.	1885-86.	1886-87.	Total.		1884-85.	1885-86.	1886-87.	
	Rs.	Rs.	Rs.	Rs.		Rs.	Rs.	Rs.	Rs.
Avenues ...	61	...	...	61	Avenues,	154	...	...	1,894
Avenues and groves ...	...	385	...	385	Estabt.	1,740	...	.	
Ditto ...	...	...	81	81	Do.	...	1,458	...	1,458
					Do.	...	...	2,416	2,416
				527					5,768

Establishment.—The establishment consists of 1 darogha, 1 mali and several beldars. Supervision is carried on under the immediate control of the Deputy Commissioner; the Tahsildars exercising the necessary supervision in their Ilaquas.

The lopping of trees is carried out by the permanent establishment assisted by hired labour.

Station garden.—There is a Municipal garden outside the town and within an easy distance of the Government Katchery and Civil lines.

BANNU DIVISION.

28.—BANNU DISTRICT.

General remarks.—The year has been unfavourable to tree-planting in Marwat tahsil and in the rest of the district, although water is generally procurable, yet the dryness of the winter has doubtless encouraged many of the zamindars to appropriate more of the Government water than they otherwise would have done, and thus many young plants have suffered. However, by supplying malis at a distance from running water with mashaks, by adapting some system of responsibility from the adjacent proprietors, and by regularly prosecuting offenders, the District Committee believe that in most parts of the more favored tahsils there should be no difficulty in the preservation of young trees even in dry years.

By far the larger part of the arboriculture in the district is carried on in the immediate neighbourhood of Edwardesabad, and there are some fine avenues radiating from the city, but now that all the more favorable sites for planting are occupied, the work progresses with less energy and success. Both mulberry and shisham trees are easily obtained in the neighbourhood, and the nursery at Nowrang is now chiefly useful as a ground for a few extraneous trees and for experiments. Several new seeds are being tried at present, but as the attempts are not in any way scientifically carried on, they do not promise any great success. The establishment of nurseries being a point strongly insisted on in the report of the Committee which met in Lahore last April, the District Committee hope to start one or two in the course of the next year. A nursery at Gandi Khan Kheyl on the Gambila road will be a useful centre for operations on the important and at present treeless road to Dera Ismail Khan. The road to Laki from Nowrang which for fully six miles is as finely wooded as would be desired, becomes absolutely bare on reaching the sandy soil of the Gambila valley : but it is hoped that both here and on the Pezu road the careful planting of gum trees may be ultimately rewarded. Two large gaps in the road between Bannu and Nowrung have hitherto defied cultivation : but there is hope that attention to the instructions furnished by the arboriculture Committee may lead to greater success.

Establishment.—The establishment was increased by 6 malis (representing Rs. 360 per annum) on the 1st of April last, and now consists of a jamadar on Rs. 20 per mensem and 27 malis paid from District funds, of whom one gets Rs. 7, one Rs. 6, and the rest Rs. 5. The Public Works Department add seven malis on Rs. 5. There is also a gardener in charge of the Nowrung nursery.

Income.—The main income of the arboriculture proper of the district is derived from the fruits of the public gardens, &c., but the actual avenues and nurseries yield very little. By a considerable thinning of the tress the District Committee may hope this winter not only to improve the avenues themselves, but to prevent a considerable sum under the earlier division of Column III in the Income statement. The expenditure proper, exclusive of establishment, has been mainly employed on the construction of "burjes" which have been mainly successful in the immediate neighbourhood of the city.

I have given orders for the discharge of the present jamadar who has no qualification for the work, and am about to make arrangements to send to the Forest school at Dehra Doon a young man of this district, chosen after consultation with the leading Bammchi and Marwat Raises. Preference will be given to a man of the zamindar class, able to read and write and knowing Pashtu. A scholarship of Rs. 10 per mensem will be given to him, and on completing a 6 months course of instruction he will be appointed jamadar. At present much mischief is done to existing trees by ignorant and ruthless lopping and pruning, and the work should be under the eye of an active man able to devote his whole time to it and acquainted with the rudiments of the practical part of forestry

PESHAWAR DIVISION.

29.—PESHAWAR DISTRICT.

General remarks.—There has been nothing particular to record in the three years under report affecting arboriculture.

29,697 trees of various description were planted throughout the district at a cost of Rs. 13,592, as per the following detail :—

Road-side trees.

						Rs.	
1 jamadar	@ Rs.	10	per mensem		... ...	360	
1 mali	@ ,,	8	,,		... ...	288	
2 ,,	@ ,,	7	,,	each	... ...	504	
28 ,,	@ ,,	5	,,	,,	... ...	4,963	
1 ,,	@ ,,	4	,,	,,	... ...	144	
Feed of Bullocks			,,	,,	... ...	432	
New plantation on Gujar Gori road					... ...	200	
Land for nursery					... ...	40	
						——	6,931

Ornamental Gardens.

			Rs.	
1 jamadar @ Rs. 15 per mensem for 24 months	...		360	
3 malies @ „ 8 „ each	...	...	548	
8 „ @ „ 7 „ „	...	...	1,333	
12 „ @ „ 6 „ „	...	...	1,714	
8 „ @ „ 5 „ „	...	...	960	
1 „ @ „ 5 for 3½ months	...	...	17	
1 „ @ „ 4 do.	...	...	14	
1 „ @ „ 3 for 17 months	...	...	51	
2 „ @ „ 2 each for 7 months	...	...	28	
1 „ @ „ 2 for a month	...	...	2	
Contingencies	...	...	1,634	
				6,661
GRAND TOTAL	...			13,592

I am endeavouring to do away gradually with the system, so dear to Tahsildars, of planting road-side trees without roots and leaving them without protection, the only advantage of which is that it shows a large number of trees in the annual returns as having been planted during the year. Unless trees are carefully planted, protected and watered for two or three years, they are of no use. This of course causes increased expenditure, but I consider it better to plant and protect one mile well than ten miles carelessly. Captain Deane, Assistant Commissioner of Mardan, has shown great energy in his Sub-Division, and has within the last year planted several miles with road-side trees in the vicinity of Mardan.

Fodder trees are not grown in this District.

32.—HAZARA DISTRICT.

Description of work.—Avenues.—During the three years under report no new avenues have been planted except in the Haripur Tahsil, the work on avenues has been merely the filling up of gaps in existing avenues.

Groves.—Sarban.—No new groves have been planted except some 5 acres of hill waste with the permission of the owners on the Sarban hill above the station of Abbottabad, on which trees were transplanted from existing nurseries.

Sultanpur.—At Sultanpur some 20 poles of land covered with an overgrown nursery trees has been cleared as the wants of the people can be met from Abbottabad as easily, with less expense to the District Fund.

Nurseries.—Work in the nurseries has been steadily carried on, young trees being distributed as they were fit for transplanting.

Income and Expenditure.—Statements for 1884-85, 1885-86 have already been submitted in those years, and it is not necessary to repeat them again.

		Rs.
District Funds, Income		153
Expenditure		760
Deficit ...		610
Municipal Funds, Income		1,583
Expenditure		409
Surplus ...		1,444

This will show that the funds at the disposal of the District Board are quite inadequate to the wants of the District.

Establishment.—District Fund establishment was the following :—

	Rs.
1 head mali @ Rs. 5	60
1 mali @ Rs. 6	72
1 mali nursery @ Rs. 7	84
1 „ Thorburn Rakh @ Rs. 6	63
2 watchers Civil Kakh @ Rs. 5	120
2 malis Mansehra and Shinkiari @ Rs. 5 ...	120
Contingencies	244
TOTAL ...	763

and Municipal 4 malis and contingencies = Rs. 409.

Fodder trees.—In this District no trees are planted for fodder ; but all mulberry trees, specially in the Haripur Tahsil, are lopped to provide fodder for cattle, but mulberry trees are not specially planted for this purpose. The wild brushwood on the hill-sides is much

used for fodder for camels and buffaloes, but little if any is fed to milch-cows or plough cattle.

Financial results.—As the whole of the ready made avenues were long ago transferred to the Public Works Department, the Local Funds have no opportunity of re-couping themselves from the expenditure incurred thereon. Their income is only from trees of more recent date.

33.—KOHAT DISTRICT.

General remarks.—*Rainfall.*—The following table shows the rainfall for each of the last three years (1884-85 to 1886-87) as compared with the average fall of rain for past years as reported by the Meteorological Reporter to the Government of India, and attached to Circular No. 6A, dated 20th September 1883, from the Commissioner of Settlements and Agriculture Punjab.

	1884-85.	1885-86.	1886-87.	*Average for former years.*
Total ...	18·05	26·46	10·57	19·60

The rainfall for the year 1884-85 was about the average and for the year 1885-86 it was much above the average, but it was somewhat unequally distributed.

There was excessive rainfall during April and May 1885 which proved injurious to plantation. The rains were, however, sufficient during the subsequent months of the year. There was some rain during the first part of the year 1886-78, but the later half was one of prolonged drought in common with the whole Province.

This, however, did not much affect the plantation of trees in avenues of roads in charge of District Committee, as they are watered from the Toi and other streams.

Plantation of fodder trees.—Mortality to cattle from decrease of pasturage in consequence of drought has been a thing almost unknown in the District, as it is a hilly District which contains good waste lands available for grazing grounds. Nothing has therefore been done towards planting of trees for fodder.

The year 1886-87 has, however, been of a most exceptional character, when heavy mortality has been reported amongst cattle from scarcity of fodder in villages mostly dependent on rain for the irrigation of their lands.

Systematic working plan for District arboriculture in the Kohat District.—With reference to para 6 of the proceedings of His Honor the Lieutenant-Governor, Punjab, on the Arboricultural Report for 1883-84, the question of systematic working of arboriculture in the District was laid before the District Committee and the following scheme was drawn up, a copy of which was submitted to the Commissoner under cover of this Office No. 557-2824, dated 24th December 1884.

"Commissioner's Circular No. 219, dated 25th November 1884, laid before the Committee."

The circumstances of the District are unfavorable to arboriculture.

The planting of trees on the main line of roads, *viz.*—

Kohat to Khushalgarh,
Ditto Hanghu and Thull,
Ditto Bannu,

is under the charge of the Public Works Department. The funds at the disposal of the District Committee are too small to allot any large amount for arboriculture. The promotion of arboriculture in the forest tract of Khwara and Zira, need not be referred to here, as the condition of these forests has formed the subject of a separate reference.

The Khallak Ilaqa gets so little water that it would be useless to expend money there on arboriculture.

In places like Hangu there is no necessity for any elaborate system of arboriculture, as where a suitable place can be found trees are planted by the people themselves. The only places where any improvement could be made with the small sum of money at the disposal of the Distirct Committee, are Kohat and its neighbourhood, and this is the only tract to which the District Committee could direct any attention. The localities selected by the Committee are—

1. The maintenance of the Circular road.
2. The Jarwanda Road.
3. The road leading from the tahsil gate to the Hangu road by the Police lines.
4. An avenue near the Police lines.
5. The road leading to the District Kutchery.
6. Kharmatu and Dhoda road, 7 miles.
7. Shekhan road, 3 miles.

8. Bowana road 1½ mile.

9. Grove in Jarwanda 2 kanal.

Shisham and mulberry are the species that thrive best in the District.

The District Committee will direct its attention to the plantation of the Jarwanda road.

The present establishment consists of—

	Rs.
3 rangers @ Rs. 5 each ... ... =	15
2 bhishtis, 1 @ Rs. 6 and 1 @ Rs. 5 ... =	11
TOTAL Rs. ...	26 × 12 = 312

The Committee would increase the establishment by two rangers and 1 bhishti, costing Rs. 180 a year, or total Rs. 492. The allotment is Rs. 500; with this establishment the works enumerated above will be gradually taken in hand.

The members of the Committee will try to interest the zamindars in this matter.

Description of work—Avenues.—The following statement will show the progress made during the past three years in planting trees in avenues of the roads in charge of District Commoittee :—

Name of Road.	No. of trees on 31st March 1884.	Planted during the three years 1884-85 to 1886-87.				Died.	Remaining on 31st March 1887.	SPECIES OF TREES.
		1884-85.	1885-86.	1886-87.	Total			
Circular Road ...	152	690	495	427	1,612	999	765	Mulberry, "shisham" willow, battang, hulyar, (bachnar).
Jarwanda Road ...	...	60	...	1,567	1,127	201	1,426	Banian, mulberry, willow, shisham, bakain, bedmushk, battang.

The work done on the *circular road* consists chiefly of filling gaps and blanks in avenues and preservation of trees previously planted. A good many of the trees died on this road owing to the excessive rains which lasted from end of March to end of May 1885. The soil of this road is not good and the mulberry trees do not grow well on it, but the gum trees are thriving and promise well.

Jarwanda road.—This is a new road which was selected by the District Committee for plantation.

In 1884-85 60 willow trees were planted as an experimental measure, none of which died.

In 1886-87, however, a good number of trees (*viz.* 1,567) were planted, of which 1,366 or 87 per cent. have been successful. These plants were mostly taken from Ghulam Haidar Khan Kyani's and Municipal gardens, and some plants of shisham were taken from the nurseries on the circular road.

Nurseries.—There are two small nurseries containing shisham, mulberry, sarin, bakain and "kachnar" trees on the circular road. They supply plants in alternate years for this road as well as the Jarwanda road, but the supply is insufficient and the plants for these roads are sometimes procured from the Municipal garden and elsewhere.

Establishment and supervision.—The following is the strength of establishment maintained and the expenditure incurred by the District Committee during each of the last three year :—

1884-85.

	Rs.	A.	P.	
Head mali for 4 months @ Rs. 10 per mensem =	40	0	0	per annum.
3 malis @ Rs. 5 each = 15 „ =	180	0	0	„
2 bhishtis, 1 @ Rs. 6 and 1 @ 5=11 „ =	132	0	0	„
Miscellaneous planting	128	11	3	
TOTAL ...	480	11	3	

1885-86.

3 malis @ Rs. 5 each = 15 ... per mensem =	180	0	0	per annumn.
2 bhishtis, 1 @ Rs. 6 and 1 @ Rs. 5=11 „ =	132	0	0	„
TOTAL ...	312	0	0	

1883-87.

			Rs.	A.	P.	
4 malis @ Rs. 5 each =20	...	per mensem =	240	0	0	per annum.
1 bhishti @ Rs. 6	...	... ,, ,, =	72	0	0	
		Total ...	312	0	0	
		Fines &c. ...	5	6	0	
			317	6	0	

Up to the end of the year 1885-86 3 malis and 1 bhishti were employed on the circular road and 1 bhishti at Khushalgarh to look after the grove in the Dák Bungalow. In 1886-87 the services of the bhishti on the circular road were dispensed with and a mali was employed in his place, making in all 4 malis : 2 of these have been employed on the circular road and 2 on the Jarwanda road.

Ornamental garden.—There is a flourishing Municipal garden at Kohat which has been well looked after by the head clerk of the district office, and is now greatly improving under the supervision of Lieutenant McMahon, Assistant Commissioner.

It is being gradually filled up with good varieties of fruit trees from Lahore, and it is intended to encourage bamboos which are good for purposes of shade and will yield an income.

The following statement shows the receipts and expenditure on account of the garden during each of the last three years:—

Year.	Receipts.			Expenditure.									Deficit.		
				Pay of Establishment.			Miscellaneous Charges.			Total.					
	Rs.	A.	P.	Rs.	A.	P.	Rs.	A.	P.	Rs.	A.	P.	Rs.	A.	P.
1884-85	279	8	0	326	0	0	262	13	6	588	13	6	309	5	6
1885-86	265	0	0	344	12	6	57	3	6	402	0	0	137	0	0
1886-87	462	2	6	379	9	11	203	9	1	583	3	0	121	0	6

The deficit is gradually decreasing, and there is every reason to expect that this garden will soon become self-supporting.

I observe that the proposal of the District Committee to increase the establishment (*vide* para 4 above) has not yet been carried out, and I am inclined to think that it is better to keep on the old establishment and leave a margin for contingencies. A small addition to very small establishment cannot be productive of much good.

The following table will show the amounts sanctioned in the District Fund Budgets and the expenditure incurred for the last three years :—

Year.	Amount sanctioned.	Amount spent.		
	Rs.	Rs.	A.	P.
1884-85	500	480	11	3
1885-86	302	312	0	0
1886-87	400	306	9	11

From this it will be seen that for the last two years, the full amount of Rs. 500 (as promised by the District Committee in their minute for December 1884, mentioned above) was not provided in the Budgets, and the amounts sanctioned were not fully spent. I have now ordered the matter to be brought before the next District Committee with a view to considering the matter. It is proposed to add the following roads to those being planted as opportunity offers :—

(1) The road leading to Mir Khewali from Tahsil gate to bank of Toi, about ½ mile.

(2) The road leading to Bar from Tahsil gate to Gari Mowaz Khan.
(3) The short road from Tahsil gate to meet Hangu road, near the Jail garden.
(4) Tappi and Bahadur Kot road.

WESTERN JAMNA CANAL, HANSI DIVISION.

Statistics.—The figured statements in the prescribed forms for 1884-85 and 1885-86 have been submitted previously, and for 1886-87 are herewith forwarded, showing work done during the year.

Financial results.—The proceeds from the canal plantations during the 3 years under review show a total of receipts as under :—

1884-85	...	Rs.	7,560
1885-86	...	„	9,189
1886-87	...	„	6,145=22,894.

The falling off, in receipts for 1886-87 is due to the whole of the timber used on the moveable platform bridges, Hansi canal, not having been credited to that head till April 1887.

The expenditure on the canal plantation has been :—

1884-85	...	Rs.	2,602
1885-86	...	„	2,205
1886-87	...	„	2,338
	Total	Rs.	7,145

The comparison of the above figures shows a net surplus income of Rs. 15,749.

Description of work done.—During the past 3 years certain portions of the canal berms were sown with seeds, and gaps in avenues were filled up. On the whole the plantations on he canal berms were not very successful.

Two roods of land were planted in the canal chowki compound at Hissar during 1886-87, but owing to the depredations of the whiteants these trees were nearly all destroyed. The plantation of fruit trees at Hansi was destroyed by the heavy rain in the monsoon of 1885, the land became water-logged and only a few of the gum trees survived.

The plantation of grafted mangoe at Jhind is flourishing.

The seeds of the katang bamboo proved fairly successful and the young plants planted out are flourishing.

The grazing of canal banks, where plantation operations are not in progress, has been successful in keeping down the growth of high grass and jungle.

The gaps in the avenues have been filled up with young trees and has been fairly successful.

Receipts.—There has been a large number of shisham trees felled on the lower portion of canal for the construction of the Platform bridges ; these trees were of full growth. The receipts owing to the completion of these bridges will probably show a falling off as there will be no large demand for timber.

Table showing number of trees at the close of the year 1886-87.

	NUMBER OF TREES.															TOTAL BY CLASSES.			TOTAL.	BAMBOO CLUMPS.
	SHISHAM.			KIKAR.			TUN.			MANGOE.			OTHERS.							
	Classes.			Classes.			Classes.			Classes.			Classes.							
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3		
Balla Canal ...	120	122	57	17	18	18	182	16	11	1	1	3	305	496	574	625	653	663	1,941	...
Hansi „ ...	2,798	10,366	8,675	1,878	7,836	8,360	93	562	429	4	29	5	2,565	9,031	14,114	7,338	27,824	31,583	66,745	2
Darba Branch ...	311	1,469	1,970	106	797	1.596	...	...	3	...	...	....	18	92	1,054	435	2,358	4,623	7,416	...
Bahadra „ ...	1,147	3,898	2,543	86	850	3.042	...	3	5	...	...	...	104	421	6,079	1,337	5,172	11,669	18,178	...
Butana Canal ...	99	770	720	184	1,192	514	420	1,391	299	2	14	10	351	1,091	1,674	1,056	5,358	3,217	9,631	...
Right Fork ...	36	409	281	20	147	171	11	25	13	...	1	...	210	619	806	277	1,201	971	2,449	...
Left „ ...	90	1,593	1,236	32	164	179	29	65	35	3	58	53	309	1,998	2,183	463	3,878	3.686	8.027	...
Total ...	4,601	18,627	15,482	2,323	11,004	13,880	735	2,062	795	10	103	71	3,862	14,648	26,184	11,531	46,444	56,412	1,14,387	2

Last year ...	1,16.526
Decrease ...	2.139*

* Decrease due to trees blown down and trees used for works.

KARNAL DIVISION, WESTERN JAMNA CANAL.

General remarks.—This appears to be the first occasion on which a tri-ennial report has had to be submitted by this Division.

It is prepared in accordance with No. 6165, dated 7th October 1884, of Officiating Junior Secretary to Government Punjab, to the Secretary to Government of India.

It appeared to be the object of His Honor the Lieutenant-Governor that the work of his officers should be reduced, and that these returns should be lessened. The result of the arrangement is, however, to add one more report to those already submitted.

The inconvenience of drafting a tri-ennial report is obvious where the officers, who have been formerly in charge of the Division, have left without leaving any narrative record of the progress made by them for each year.

In the Karnal and Umballa parts of the Western Jamna Canal many trees grow spontaneously with facility, and but little active operations are necessary.

Description of work.—In 1884-85 nothing appears to have been done towards extending the plantations.

Likewise in 1885-86 no extensions were noted, but the usual operations of maintenance; clearances and felling proceeded.

In 1886-87 the present Executive Engineer made a start towards planting out the New Main line, by laying out plantations above Jani and Munak. The latter was fenced in and the former will be.—Shisham trees were transplanted from nurseries in this place.

Avenues were planted out at Dadupur and Munak. A new mangoe garden of the Bombay variety, area 2 acres, was planted out at Dadupur. The garden there sells annually at an average of about Rs. 500, which is far more than its cost to maintain.

The spoil banks of the New Main line were sown with kikar originally. They have advanced well, but many appear to dry up. It is said that the roots are attacked by rats, which cause dessication.

The parts in embankments have yet to be planted, but in many places the trees grow spontaneously.

The spoil of Main drain No. 2 from Babail to Chhajpur was thrown up last year but not sown or planted. It is now bearing a dense growth of young kikar trees which average 5 or 6 feet in height.

A large undertaking was that of clearing and felling all trees on the mill channel at Karnal which were fit for timber or fuel. Small trees and those of a choice nature were left which will grow up and re-emboise the banks.

The old Main line canal having been shut off in 1885 is lined with many fine trees. Some of these were cut for works, and others are fit for felling. The Canal Department cannot now exert a very efficient supervision over these outlying parts. It may be desirable to transfer them to the care of the District officials.

The cost, count of trees, and other statistics are entered on the accompanying statements.

The report has been delayed owning to failure of the 2nd Sub-Divisional officer to submit his counts and returns punctually.

Karnal Division, Western Jamna Canal.—Table V. A.—Number of trees at the close of the year 1886-87.

Localities.	Number of trees.															Total.			Grand Total.	Bamboos in clumps.	Area of small plantations acres.
	Sissu.			*Kikar.*			*Tun.*			*Mangoes.*			*Other kinds.*			Class.					
	Class.			Class.			Class.			Class.			Class.								
	1st.	2nd.	3rd.	1st.	2nd.	3rd.	1st.	2nd.	3rd.	1st.	2nd.	3rd.	1st.	2nd.	3rd.	1st.	2nd.	3rd.			
1st Sub-division.																					
Hathnikund to Dadupur	...	40	242	...	...	26	1	7	31	...	1	8	10	77	120	11	125	427	567	...	...
2nd Sub-division.																					
Old canal	792	1,776	1,465	519	4,908	27,734	61	192	259	9	56	15	895	2,837	5,620	2,276	9,769	35,093	47,138	20	59·876
New main line	...	1160	42,530	...	9	1,345	...	...	...	11	39	30	1	19	142	12	1,227	44,047	45,286	...	73·157
Distributaries	6	51	410	6	328	2,685	6	18	130	12	18	7	63	173	2,729	93	588	5,961	6,642	...	...
Escape	...	2	60	16	330	1,711	1	5	11	...	1	...	...	11	97	17	349	1,879	2,245	...	...
Indri cut	83	833	253	184	2,243	12,450	1	7	11	9	3	1	101	360	563	378	3,446	13,278	17,102	...	...
Separate plantations...	3	60	42	5	72	283	...	2	...	10	101	31	32	51	44	50	286	400	736	...	...
Total ...	884	3,8 2	44,760	730	7,890	46,208	69	224	411	51	218	84	1,092	3,451	9,195	2,826	15,665	1,00,658	1,19,149	20	133·033
Grand Total ...	884	3,922	45,002	730	7,890	46,234	70	231	442	51	219	92	1,102	3,528	9,315	2,837	15,790	1,01,085	1,19,712	20	133 033 Acres.

UPPER SUTLEJ CANAL DIVISION.

General remarks.—The rainfall for the years 1885-86 and 1886-87 has been much under the average, though in 1886-87 there was a decided improvement over the preceding year. In 1884-85 the rainfall may be said to have been good. The table subjoined has been prepared from the District reports for the Dipalpur tahsil and is generally true for the whole Division.

District.	Raingauge.	During year.	Inches.	Average inches.
Montgomery	Dipalpur ...	1886-87	7·60	8·30
		1885-86	5·00	
		1884-85	12·20	

The indigenous trees of the tract are jhand, farsh, karil and beri, and are little more than bushes at the best. Around the wells kikar and pipal are to be found ; along the road-sides kikar and siris where there are water-courses. Similarly along the canal banks kikar, siris, with a few shisham trees exist and form the avenues which are detailed in the tabular report. Little has been done to planting out trees, excepting in the chouki compounds, from the fact that these canals being only in flow in the hot weather a supply of water cannot conveniently be obtained during the cold weather months, and at any time would always cost a great deal in the application, as there is no flow irrigation close to the canal banks. But in such a dry tract any kind of tree is acceptable, and it is fortunate that there is a spontaneous growth along the canals and water-courses which give a relief to the eye and a desirable shade for cattle.

Description of work done.—As may be inferred from the above paragraph, the work undertaken is mostly that of planting and maintaining the chouki compounds. The dead trees and windfalls on canal banks have to be removed, but this is mostly done by the people who buy them. Such wood is not of much value, though latterly Rs. 2 a hundred cubic feet of stacked timber has been given willingly by purchasers who have done the cutting, and stacking at their own cost.

The year under review has seen the completion of the choukies of the Lower Sohag and Para Canal, and this accounts for the extension reported under groves.

Establishment and supervision.—The work is looked after by the Engineering members of the Establishment. Malis are entertained at some of the canal choukis, and for the rest coolies are employed when required.

Financial results.—In 1885-86 there was a dearth of fodder. The zamindars were allowed to lop the kikar trees lining the canal banks, and a good sum was realized in this way, though no attempt was made to secure the best prices available. On the contrary it was carefully arranged that no sub-selling of the leases should take place, and that only those should be allowed to purchase the several lots whose village lands were adjoining them, and that the prices paid were distributed evenly amongst the villagers in each case. In this way a fair income was realized, and the zamindars materially benefited. The trees survive the lopping and appear to be none the worse for it. There were restrictions as to the size of boughs that were to be cut, and in all cases the zamindars observed these restrictions in a very satisfactory manner. Last year no loppings were sold, but the income has been raised, principally, from sales of fallen and dead trees. The legitimate income of the Division is derivable from sales of grass, but there is yet much to be done in getting rid of dead trees. A statement is subjoined giving the income and surplus over expenditure for each of the three years under report :—

Years.	Income.			Surplus, expenditure.
	Lopping.	Dead trees.	Grass.	
1886-87 ...	...	1,175	2,637	2,755
1885-86 ...	2,632	291	1,438	3,487
1884-85 ...	...	998	3,635	2,914

There was not the usual growth of grass on the Canal banks and rajbahas in the last two years owing to deficient rainfall.

WESTERN JUMMNA CANAL, DELHI DIVISION.

This tri-ennial report is submitted under Punjab Government Circular No. 552, dated 16th December 1884, on the arboricultural operations of the Division and contains brief descriptions of what has been done during the years 1884-85, 1885-86 and 1886-87.

Description of work.—Gangatoli garden.—During the year 1884-85, 40 plants of grafted mangoes, 40 orange plants and 10 plantain plants were planted in this garden. Of these 7 plantain plants died and the remainder were doing well.

In 1885-86 a large number of grafts have been in preparation here. Some were planted out to fill gaps in the same garden. These all failed as the whole compound was drowned during the rains and lay under two feet of water. This proved too much for the young trees, though the old ones were not damaged. During the year 1886-87 at Gangatoli a good deal of grafting from the existing mangoe have been in progress. Young plants have been sent to Serai Rohilla Khan and Siraspur choukis and a number reserved for planting out in vacant spaces in the Gangatoli next rain.

Siraspur New Chouki.—In 1884-85, 100 plants of country mangoes were planted, but with the exception of 30 plants which were doing well, all others were destroyed by whiteants. Susoo seedlings, about 100 in number, and 3 Banyan plants were also transplanted.

During 1885-86 a number of young mangoes were planted also at this chouki.

During 1886-87, 36 mangoes trees from Gangatoli have been planted out and the plantation has been fenced.

3 Banyan trees have also been planted as shade-trees.

New Delhi Branch.—During 1884-85, kikar seed was sown on New Delhi Branch in places on patrol bank between Jua and Kakroi. It sprouted very scantily and low kikar bushes were seen here and there.

During 1885-86, 25 acres of spoil have been ploughed, roughly levelled, and sown with shisham, also arrangements were made for watering the same from the canal and Ahulana rajbaha.

During 1886-87, in 1st Sub-Division on New Delhi Branch banks, the plantations planted out have been very successful where outlets and means of irrigating existed, shisham and kikar have come up very thickly ; where however no means for irrigating were provided the plants failed entirely, nothing whatever resulting from the seed sown. Out of the total area sown only some 6 acres were unprovided with outlets, and as it was only in these plots that the sowings failed, the plantations can be said to have been fairly successful. In the 2nd Sub-Division no trees have been planted out along the canal. Before the opening of the New Delhi Branch below Jua, an estimate was sanctioned for kikar plantations along the spoil of the new canal, but this was afterwards cancelled by order of Superintending Engineer owing to no funds being available.

Gangatoli Rajbaha.—During 1884-85 on the right bank of this Rajbaha from head 16,000 feet a reach of 8,000 feet was planted with shisham, tun, jamua, nim and siris trees 25 feet apart from each other, of these half the number of trees planted died. Further on the same bank a length of 6,400 feet was sown with kikar in ditches, but it did not sprout. On the Mughalpur minor a length of 7,000 feet, trees were planted on 2,500 feet on right bank. During 1885-86 and 1886-87 the trees planted out were maintained.

Rohtak Rajbaha.—During 1884-85 a few grafted mangoe plants were transplanted in Saragthal chouki garden.

On the Rajbaha banks in the spring, mulberry, &c., were planted in an avenue 1½ mile long, and in another length of 3 miles kikar seed was sown in trenches.

In the rains trees were again planted on a length of ½ a mile and more kikar seed was sown in shallow trenches on a length of 4 miles along the right bank of the Rajbaha. The results were generally favourable. New nurseries were also laid out.

During 1885-86 no new trees were planted out, but the existing trees were looked after. The trees in the Saragthal compound have been tended. The young Bombay trees have commenced bearing. A few mangoe grafts from this garden have been planted in the Bhainswal Bungalow compound.

During 1886-87 the trees were maintained and no new trees planted out.

Gohana Rajbaha.—During 1884-85 the older plants were properly tended and a large number of new ones added.

During 1885-86 no new trees were planted, but existing trees were protected and kept pruned and trimmed.

During the year 1886-87 more trees were planted out, and a considerable number of self-sown trees sprung up.

Madloda Rajbaha.—During 1884-85 a new plantation was started.

In 1885-86 a number of young trees were planted out and those previously planted were protected as far as possible.

In 1886-87 more trees were planted.

Israna Rajbaha.— During 1884-85 the young plants of former years were properly tended and a large number of new ones added.

In 1885-86 the compound of the Israna chouki was almost devoid of trees ; here a good deal has been done. The ground has been ploughed, roughly levelled, and a small channel dug for irrigation purposes. The few existing trees have been looked after, and a fresh nursery sown with shisham. An experimental plot of bamboos was sown.

The guinea grass sown has been transplanted; a line of shisham was also planted out along the main line of the rajbaha from the compound nursery. During 1886-87 more trees were sown.

Ahulan Rajbaha.—During 1884-85 new plantations were started.

During 1885-86 a few trees were planted out along the Rajbaha and a small nursery of shisham was sown at the Naraina compound, also a plot of bamboos.

During 1886-87 more trees were planted.

Chouki compounds.—During 1886-87 in the chouki compounds where young trees planted in previous years had grown up very thickly ; a considerable number have had to be rooted up.

The rainfall during the year 1886-87 has been somewhat smaller than the previous years 1885-86.

The number of different species of trees counted at the close of the years under report is as follows :—

	1886-87.	1885-86.	1884-85.
Shisham	21,272	25,462	30,776
Tun	3,608	3,912	4,412
Kikar	41,885	44,284	51,675
Mangoes	2,520	2,322	5,355
Miscellaneous	50,503	55,979	55,362
TOTAL ...	1,19,788	1,31,959	1,47,580

The total length of both banks of new Delhi Branch, new distributories, &c., is 1,277, 92 miles as per detail in the statement of avenues attached to this report, which also shows how many miles are already planted with different species of trees, and how many miles are still available for plantation. The length of single line of avenues planted out during the year 1886-87 was 3,605,790 feet, and the length of avenues on which plantation has failed or on which trees or established plants have been destroyed was 20,800 feet.

Establishment.—No special establishment for plantation is kept up in the Division, but the work is supervised by the Sub-Overseer in charge of sections ; malis and beldars are employed as required.

Financial results.—The following table shows the income for 1886-87 and for the two previous years.—

	1886-87.	1885-86.	1884-85.
	Rs.	Rs.	Rs.
Sale of Timber and Fuel	2,105	5,064	8,221
„ of fruits	700	1,035	655
„ of grass	714	215	287
Miscellaneous	30	6	47
TOTAL ...	3,549	6,320	9,210

The expenditure during the last three years is as follows :—

	1886-87.	1885-86.	1884-85.
Planting	833	305	705
Maintenance	960	506	663
Extension of avenues	369	112	173
Afforestation of waste land	...	550	...
TOTAL ...	2,162	1,473	1,541

BARI DOAB CANAL, 1ST DIVISION.

1884-85.—In the upper parts of the Division the work done consisted in removing dead trees, filling in gaps in lines of trees and prunning.

A small nursery was established at Madhopur for rearing young plants for transplanting.

The plantation right bank between Dhariwal and Kalair was enclosed by wire fencing.

Kasur Branch.—Operations were confined to two plots on this branch. One comprising an area of 25½ acres, extending on both sides of canal, from B. M. 160 to B. M. 168, known as the Jhandiala plantation.

The other comprising an area of 56·4 acres extending from B. M. 178 to B. M. 196 on both sides of canal, known as Pakhoki plantation. Both plantations were protected by wire fencing. The method of sowing adopted in the Jhandiala plantation was by dibbling seed in at distances of 1 foot a part. The plantation was irrigated from a head fixed above the nearest fall in the canal, a distance of 6 miles from the head of plantation.

The seed thus sown germinated freely, but owing to the excessive length of water-courses, irrigation could not be effectively carried out, and more that half the total area proved a failure. The Pakhoki plantation was sown in March and April with kikar seed, arrangements for irrigation were made by means of 4 water wheels worked by bullocks, it was soon found that the area commanded by the wheels was extremely limited owing to the sandy nature of the soil. They were consequently abandoned in July of the same year.

The total area fenced in and sown during the year was 82 acres, out of which an area of 12 acres was fairly well stocked at the end of the year.

Sobraon Branch.—During the three years under review, plantation operations on this branch have been carried out in 2 fenced plantations known as the Gagarbhana and Khawaspur plantations.

Gagarbhana plantation.—In March 1884 a wire fence was fixed along the left boundary from B. M. 96 to B. M. 156, the fence being left open at road crossings The whole area was sown with kikar and shisham by dibbling the seeds in. It was watered by 3 pipe outlets fixed in the canal at B. M. 95, B. M. 115 and B. M. 156, in each case just above a fall. The seeds germinated but were destroyed by cattle which crossed from right bank of canal, where there was no fence.

Khawaspur plantation.—The Khawaspur plantation area 4 acres, from B. M. 220 to B. M. 223 on left spoil, was fenced in, in March 1884 as an experimental unirrigated kikar plantation. Kikar seed was sown broadcast and germinated fairly in low-lying places.

1885-86.—In the upper parts of the Division, the work consisted in removing dead trees, filling in gaps and transplanting, in place of dead trees in avenues. The mangoe plantation and groves were kept up during the year.

The plantation between Dhariwal and Kalair was maintained.

Kasur Branch—Jhandiala plantation.—In March 1885 additional irrigation for the Jhandiala plantation was provided by fixing two stream-wheels in the canal at opposite ends of the plantation, seed was again sown by being dibbled in as before on the left side of the canal, while the right was trenched at intervals of 10 feet parallel to canal, and cross trenches were dug at 100 feet apart for purposes of irrigation. Kikar and shisham was sown along the edge of the trenches.

Operations during the year were most successful, and by March 1886 3-4ths of the total area was well stocked with young trees.

Pakhoki plantation.—In view of the non-success of the preceding year's April sowings, it was decided in June 1885 to again sow the whole of the Pakhoki plantation with kikar in the hope that the seed would germinate during the rains. The rains of 1885 failed. In

October of the same year two stream wheels were fixed with a view to ascertain how many would be required to irrigate the whole in such sandy soil as was met with in this plantation.

The net result of operations at the end of the year may be taken, that 20 acres out of 82 were stocked with young trees.

Sobraon Branch—Gagarbhana plantation.—It was considered advisable to reduce the length of the Gagarbhana plantation and enclose both sides of the canal so as to prevent cattle crossing the canal, and destroying the young seedlings as they had done during the previous year. The fence was consequently removed from B. M. 95 to B. M. 126 and set up on the right side of canal, from B M. 126 to B. M. 151. The whole of the area now enclosed, 96 acres, 48 on either side of canal, was resown in March 1885 with kikar and shisham. Irrigation could not be carried out as the water-course along the Patrol road was inefficient and water could not be got to reach the end of the plantation, and the sowing proved a failure.

Khawaspur plantation.—In July 1885 the bare and high spoils in the Khawaspur plantation were again sown with kikar, but the rains proving a failure the sowings were not successful.

1886-87.—In the upper portions of the Division, the work done consisted in removing dead trees, filling in gaps in lines of trees about Madhopur and prunning.

Tibri plantation.—An area of 6 acres was ploughed up, trenched and water-courses laid out in May and June, later on it was sown with kikar seed.

Plantation between Dhariwal and Kalair.—Holes were dug for jaman trees, and in July they were transplanted from Malikpur chouki.

In August, September, October, November, December, 1886, and January and February 1887, the trees both at Tibri and Kalair were tended and watered. In March 1887, a new water-wheel was erected at Tibri for the plantations, and at Dhariwal to Kalair 200 young jaman trees brought from Malikpur and planted in the lower parts.

Kasur Branch.—Jhandiala plantation.—In March 1886, such plots in the Jhandiala plantation as were bare were resown and the net result at the end of the year is that the whole area of 25 acres may be considered to be stocked with young trees.

Pakhoki plantation.—In March 1886, a third stream-wheel was erected for the Pakhoki Plantation. These three stream-wheels, together with two pipe outlets in either bank, near the head and tail of the plantation, were considered sufficient if the plantation was trenched. The plantation was therefore trenched at 10 feet intervals, and kikar and shisham seeds were sown along the edges of the trenches, the higher portions with kikar and the low-lying parts with shisham.

The whole of the seed germinated freely, but owing to the seedlings not being kept cleared of jungle in August 1886, and to cold in the months of January and February 1887, many of the seedlings died down.

Deo plantation.—In March 1886 a new plantation was fenced in, from B. M. 190—203 on both banks (with wire from Bohiwal plantation now established) having an area of 15 acres. This was irrigated from pipe outlets from the ditch Rajbahas, running alongside. The system adopted was trenching at 10 feet intervals. The seed sown was shisham and kikar. Owing to uncleared jungle-growth in August 1886, and the cold of January and February 1887, which might have been averted by liberal waterings at the time, most of the young seedlings were destroyed.

The net result of the year's operation is area under operation 98 acres.

Ditto ditto ditto „ stocked about 29 „

Sobraon Branch.—In March 1886, the whole of Gagarbhana plantations from B. M. 143—156 were again sown, with a result that the seeds germinated to a certain extent, but were cut down by the cold of January and February 1887. Sowings were also carried out in the Khawaspur plantation, which may be said to be fairly stocked with trees.

The result of three years operations on the Sobraon Branch may be taken to be 50 acres stocked out of 100 acres operated on.

2ND DIVISION, BARI DOAB CANAL.

This report embraces the work done during the past three years, and the work generally has been the formation and improvement of plantation.

Main Branch Lower.—There are six plantations on the main Branch Lower as follows :—

In first Sub-Division—

(1) At Kotla.
(2) „ Grand Trunk Road Bridge.
(3) „ Jaggatpur.

In 3rd Sub-Division—

(4) At Kalsian.
(5) „ Bedian.
(6) „ Mir Mahammad.

Plantation at Kotla.—This is on the right bank of canal B. M. 53-54. It was started in 1882 and an area of 1·5 acres was then sown, but the soil being poor the result was not good.

Some of the trees died and the ground where they had been sown was left blank until 1886.

In this year these portions were again planted and looked after with a more successful result.

Plantation at Grand Trunk Road Bridge.—This is on the left bank of canal from B. M. 99 to 108. It was started in 1884 and an area of 3·5 acres from B. M. 99 to 101 was planted with shisham trees. The area planted was all covered with young shisham trees, and subsequently in 1885 another plot 13·3 acres in area from B. M. 101 to 108 was enclosed, but only 9·8 acres were actually planted during the year. The result was again successful and in 1886 the remaining portion 3·5 acres in area which had not been planted in 1885 was sown, but the result was not so good as before, some of the young trees dying owing to poor soil and insufficient care. The spaces thus left blank will be replanted in 1887-88 after the ground has been thoroughly prepared.

Plantation at Jaggatpur.—This is on both sides of the canal from B. M. 154 to 162. It was started in 1880. During the past three years the work done was only watering and tending young trees. This plantation is now thickly stocked with trees and requires thinning which will be done in 1887-88.

Plantation at Kalsian.—This is on the left bank of the canal between R. D. 2,33,000 and R. D. 2,35,000 ; it was first stated in 1881 and an area of 4 acres was planted with shisham. The result has been most satisfactory as the plantation is now fully stocked and the young trees are thriving. During a recent inspection the Superintending Engineer noticed that there were some wide-spreading kikar trees and a few badly shaped ones which will be removed. It is hoped that after the present year it will not be necessary to do more than give the trees an occasional watering.

Bedian Plantation.—In 1884 a plantation of 19 acres on the left bank of the canal below the Thamman Rajbaha was sown with shisham during the rains, excepting a plot of two acres which was reserved for indigo.

The indigo failed and another attempt was made in 1885 with the result that five maunds of seed were obtained. There was however no local demand, for this audit had to be sent into Lahore for sale.

Regarding the plantation the first sowings were made in the rains 1884 and did not succeed owing to a quick growth of jungle. But a later attempt made in February 1885 was more successful. The ground was regularly trenched and young plants put in. There was, however, a blank space of four acres near the end of the plantation where water could not be easily passed down, and this was again sown with kikar last year. But the severe frosts killed off a great number of young seedlings, and in order to fill up blank spaces, it was necessary to transplant from portions of the plot higher up where there were spare seedlings and it is hoped that by the end of this year the whole plot of 19 acres will be stocked. Water can now be given to the tail portion of the plantation from the Sarhali minor (Thamman Rajbaha).

Mir Muhammad plantation.—On the right bank of the canal below the bridge of that name was first started in 1881 where a plot of seven acres was sown below B. M. 347. This is quite a success and the trees are now thriving. The plantation was extended by two acres in 1884 and again by five acres in 1886. The result of last year's sowing is however not satisfactory for the very heavy frosts killed off numbers of young seedlings which had been sown in trenches at 10 feet intervals.

Other operations.—On Kotla Rajbaha for a distance of one mile from the head, a line of trees was established in 1885. These trees were watered and tended during 1886 and they are growing up well.

On the Basarke and Thamman Rajbahas for a mile up stream and down stream of the Pohwind and Rukhanwala chaukis, young trees were put down in 1885 and the result has been satisfactory as far as the operations near Rukhanwala are concerned. It is very difficult to keep cattle off the banks of the Rajbahas, and a good deal of damage was done to young trees by cattle ; gaps in the shade line of the Main Branch were filled year by year and generally the result has been successful.

It seems doubtful if the Sub-Overseers with such large charges, each man having over a hundred miles of Main and Minor channels to look after, can give as much attention to plantations as would appear desirable, and any extensive operations would require a special plantation staff.

Sales of wood and grass.—The following statement shows the details of sales for the past three years. A decrease in the receipts from the sale of wood during 1886-87 was due to the fact that in 1885 most of the dead and dry trees on the canal and Kiru escape were collected and sold by public auction, and thus very little was left for sale during 1886-87.

Decrease in the receipts from sale of grass during 1886-87 was due to the stopping of cattle grazing on the Rajbahas. Much less is given for the grass where only *cutting* is allowed. Villages do not seem inclined to levy grass for cutting.

Description.	Amount	Total.	Remarks.
	Rs.	Rs.	
1884-85.			
Wood	4,572		
Grass	6,907		
Fruits	2		
		11,481	
1885-86.			
Wood	6,738		
Grass*	5,657		*This includes Rs. 295 realized in March 1886 for 1886-87.
		12,395	
1886-87.			
Wood	3,734		
Grass	3,092		
		7,636	

A detailed statement of profit and loss is given below. The great increase in profit in 1885-86 was due, (1) to the fact that no extensions had taken place, and (2) to larger sales of grass.

Year.	Income.				Expenditure.	Difference.		Remarks.
	Value of wood.	Value of grass.	Value of fruit.	Total.		Profit.	Loss.	
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	
1884-85 ...	4,572	6,907	2	11,481	3,176	8,305	...	
1885-86 ...	6,738	5,657	...	12,395	1,959	10,436	...	
1886-87 ...	3,734	3,902	...	7,636	1,658	5,978	...	

There is a nursery at Grand Trunk Road bridge from which young shisham seedlings were transplanted to the unstocked portions of the small plantations.

A small nursery has also been started at Jaman where a plot of land 1,400 square feet in area has been sown with seed obtained from a large shisham tree near the chouki.

The programme for 1887-88 and the next two years will be—

(1) Maintaining existing plantations ;

(2) Improving plantations on left bank of canal from B. M. 122 to 147 (= 25,000 feet =5 canal miles) by irrigation from the new Bahoru Ditch Rajbaha.

(3) Establishing a fuel plantation on Aliwal cross Lock channel.

(4) Improvement of the portions between Dal bridge R. D. 2,70,506 and Bedian bridge R. D. 2,41, 250 on both sides of the canal, the total length of which will be 29,256 × 2 =58,512 or 11·7 canal miles and the operation will comprise—

(*a*) Felling trees that now exist in the portion to be taken up, excepting the shade line and certain well shaped trees.

(*b*) Fencing and trenching for new seedlings which will be transplanted at regular intervals of 15 feet and regularly tended until strong enough to be free from danger.

Lahore branch.—The work done during the period of three years on the Lahore Branch has been chiefly maintenance of existing plantations and gardens. Small extensions of old plantations have been made of Niaz Beg and Majupur, but nothing has been done beyond that.

On the main line of the canal avenue an attempt was made in 1884 to transplant young trees to fill up some of the many unsightly gaps. This had also been tried in previous years, but the success achieved was not great and the expenditure in establishment was heavy, so after 1884, this was abandoned. Generally speaking the line of canal (including both avenue trees and trees on spoil) is well wooded, but the annual loss of trees is considerable, and the reproduction by natural self-sowing may be considered *nil*, owing to the fact that cattle grazing is permitted, so the gaps on the canal line are increasing. Many of these gaps were never clothed with trees owing to bad kankar or *reh* soil, but in other places where

trees have died down or have been blown down, the gaps so caused invariably show a tendency to increase. To give an instance of the destruction caused by wind in October 1886, over 70 trees were blown down between Mian Mir and Niaz Beg by one dust storm.

On the distributaries some young trees were planted out in 1883 up and down stream of the inspection chaukies—these were tended in 1883 and part of 1884, but owing to the necessity of reducing establishment, nothing further was done in this direction. Most of the trees so planted out (over 2,500 in number) did well at first, but many have since died owing to want of water and damage by cattle.

The following work was done in extending plantations :—At Majupur chauki a plot of ground between the Rajbaha and canal was sown in 1884 with kikar and shisham, no water was given and the sowing was a failure.

In 1885 the attempt was made again and water was supplied by a stream wheel, but this also proved a failure, the coarse jungle grass having completely choked and killed the young seedlings. At the close of 1886 a third attempt was made. Extensive jungle clearance was done and the whole area carefully trenched. A sowing of shisham was made in March 1887.

At Kohali the upper Lock channel island was sown in 1884 with kikar and shisham, the seeds being dibbled in. This did not prove a great success, though some of the kikar at the top upper end germinated and is doing well.

In 1885 apparently nothing was done.

In 1886 the island was flooded in hopes that the roots of the old shisham trees had enough vitality left in them to coppice, but this did not prove to be the case. Some kikar seed was also ploughed in during June 1886, and this also proved a failure.

As flow irrigation is available over the greater part of the area of this island the formation of a new plantation must be feasible, and it is proposed to persevere in the attempt during the coming season.

The young plantation on the lower island reported in 1883 by Mr. Day as doing well has continued to thrive wonderfully. The roots of older trees cut down in 1884 have also coppiced well and nearly the whole of the area is now a flourishing young shisham plantation.

At Niaz Beg the shisham plantations on the both sides of the canal started prior to 1884 has been carefully tended and maintained during the last three years.

The plantation on the right bank, especially on a small plot where flow irrigation is available, has done very well, the trees now are from 10 to 20 feet high over the whole area, those on the higher ground, where lift irrigation only is possible, not having done so well. The soil is a very bad hard kunkar with reh in it, and the trees require a lot of water.

This plantation is fenced with wire and an agave hedge was also planted, but the soil is uncongenial for the latter and it has only done well in the lower and moister soil ; on the kunkar it has died down every year. During 1886 a new plantation was started on a plot of ground lying between the escape and Rajbaha. This was carefully trenched and sown with shisham during March 1887.

The line of avenue trees along the Government house Rajbaha road planted by Mr. Day in 1883, has been maintained and the young trees are doing well.

In 1884-85 revenue was obtained by sale of wood cut down for fuel and supplied chiefly to the Amritsar Provincial Division. Since that time no felling has been done, sales being restricted to wood obtained from trees destroyed by natural causes.

The value of timber has gone up during the past three years. Shisham from six to eight annas per cubic feet and kikar from 4 to 6 annas for trees of good girth. Firewood has remained nearly the same price, *viz.* about Rs. 25 per 100 maunds.

Statement of sales of wood and grass :—

Description.	Amount.	Total.	Remarks.
	Rs.	Rs.	
1884-85.			
Wood	4,128		
Grass	1,709		
Fruit	55		
		5,892	

Description.			Amount.	Total.	Remarks.
	1885-86.				
Wood[701]	...	...	4,546		
Grass	...	...	2,180		
	1886-87.			6,726	
Wood	...	...	1,754		
Grass	...	...	1,569		
				3,378	

The decrease in the receipt of wood and grass is due to the causes explained above under Main Branch Lower.

A detailed statement of the profit and loss is also given below :—

Year.	Income.				Expenditure.	Difference.		Remarks.
	Value of wood.	Value of grass.	Value of fruit.	Total.		Profit.	Loss.	
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	
1884-85 ...	4,128	1,709	55	5,892	1,609	4,283	...	
1885-86 ...	4,546	2,180	38	6,764	2,194	4,570	...	
1886-87 ..	1,754	1,569	55	3,378	1,551	1,827	...	

Timber and fuel to the amount of Rs. 1,282 is still lying in hand for sale on 31st March 1887.

SWAT RIVER CANAL DIVISION.

Water was not available from the Swat River Canal for arboricultural operation before the year 1885, and as the climate in the locality is not such as to permit of the growing of trees without irrigation except at great expense, such operations as were carried on before that time were on a small scale, being principally confined to the planting of a few trees near the various fortified posts, and the establishment of avennes along the newly constructed canal near the head where water was obtainable from the river and existing small irrigation cuts.

It was not till the returns for 1885-86 were submitted, that the operations had extended sufficiently to make a mention of them in detail necessary in the present report. At the end of the year 1885-86, about 5 miles of single avenues had been established. Of these, 3 miles were situated in the upper 5 miles of the Canal, nearly a mile near Ziam enclosare (12th mile) nearly one mile near the 18th mile, and half a mile near the 20th mile. Under progress in groves, nothing was shown, but 55 acres were reported as set apart for nurseries the ground having been prepared for seed. I think that this area would have been more properly described as prepared for the sowing of groves. It is situated as follows :—

	A.	R.	P.	
Near Ziam ...	3	3	0	On the main canal.
„ Mirabad ...	1	1	13	
„ Hissara ...	2	3	0	
„ Takhtbahi ...	18	2	0	On No. rajbaha.
„ Sari Bablol ...	29	0	0	
Total ...	55	1	13	

This land was all sown in 1886-87 and blanks have since been resown. The kinds of seed selected are shisham, which thrives remarkably well in the district with irrigation ; and kikar which is found to be liable to be destroyed during its first year by excessive cold, mulberry is now being sown in blanks, as it sows itself freely in places where the seed falls from existing trees, and as the mature trees existing, though few in number, seem to thrive well. These plantations are all fenced in with wood or steel fences and are supplied with irrigation. They are at present in a thriving state. Wherever the opportunity has presented itself during the year, seed of shisham has been sown along the boundaries of roads and rajbahas by taking water-courses along the boundary and sowing on its banks. In this way some 35 miles have been sown, but these lengths have not been treated as avenues in the

present year's statement of progress as the seedlings are only a few inches high anywhere and it is not to be expected that by any means the whole of the length will succeed, but as the cost of such work is trifling per mile, the money is well expended if any considerable fraction of the length succeeds, and gaps can be treated hereafter. Moreover, by sowing at once along new channels where irrigation is just started it will be often possible to raise trees without fencing, owing to the small population in such places and the consequent absence of large herds of cattle.

About 7 acres, *viz.* about one at each enclosure, has been set apart for nurseries.

The operations during the current year will be directed to the extension of the avenues along the main canal and the maintenance of the existing avenues and groves.

CHENAB CANAL DIVISION.

Plantation.—An estimate for Rs. 442 was sanctioned in Joint Secretary's No. 3260 I, dated 27th July 1886, for sowing the spoil banks of Escape Channel. The work was put in hand in August 1886 and the whole area was sown.

Sowing spoil banks Escape Channel.

The work however, had been started too late and the consequence was a complete failure. The greater parts of the banks consist of pure sand, so that in any case it is doubtful whether anything could have been done. The banks too are very high and cannot be irrigated.

Kot Nikka Branch.

The spoil banks of this branch were also sown, but, as in the case of the Escape Channel, too late in the season.

Very few plants have therefore sprung up, so few indeed that this attempt must also be recorded as a failure.

No attempts have been made to grow avenues or groves, as water has not yet been let into the canal.

Nurseries.—A small area has been sown at mile 2 and mile 15 Vaniki Rajha Choukis at Chouki m. o. main line and at Chokis m. 8, 18, and 28 Kot Nikka Branch, but the results are very poor.

There was no proper establishment to look after the work and the consequence is that there are not more than some two or three hundred trees. Those, however, that have stood last winter's frosts promise well. *Reh* too killed many of the plants.

Nothing was done last year : the results here recorded are due to previous years.

LOWER SUTLEJ AND CHENAB DIVISION INUNDATION.

General remarks.—Sowing of seed on spoil banks has not been attempted during the last three years as the seed of plants would be destroyed during clearances. The trees upon the canal banks are mostly self sown and grow on the water's edge.

Avenues of trees.—The statement of avenues of trees has been filled in for both the Sutlej and Chenab Canals. The trees are not in very regular lines along most of the canals only on the Chenab band are the trees planted regularly, as these dead trees are replaced by new plants.

Description of work done.—The young trees on the Chenab band and also in some chouki compounds and near Regulators Sutlej Sub-Division are regularly watered and cared for, also protected from attacks of animals, goats and cattle ; planting operations are carried on at the same time ; on the Sutlej Canals near the chouki where the same care can be taken of the plantations. Shisham seed has been sown this year and to a great extent has germinated successfully.

Plantation operations on the Sidnai Canal only commenced last May and consisted merely in sowing seed in the chouki compounds.

INDUS CANAL, DERA GHAZI KHAN DIVISION.

General remarks.—The rainfall at the Dera Ghazi Khan District, which is so small and uncertain that it has little or no effect on arboriculture, was in the first of the years under review rather above, in the last much below the average.

2. The trees in this Division are all planted in avenues, being first propagated in nur series maintained for the purpose. About 80 per cent. are shisham, the remainder being kikar siris, and farash. There are few tuns and eucalypti.

3. The progress during the last three years is as follows :—

At the end of the year		1884-85 there were	159½	inches of avenues.
Ditto	ditto	1885-86	175	ditto.
Ditto	ditto	1886-87	182	ditto.

4. In reviewing the operations of the past three years however it is somewhat difficult to balance the gain represented by so many miles of young saplings planted out against the loss as caused by the incursions of the Indus, whereby portions of the older avenues of shisham trees, of age varying from 12 to 25 years, have been swept away. At the heads of the Shoria, the Kasturi, the Sahiban, the Nur and the Kutul canals and on the Bahar Shah, the Shah Jamal and the Buliwala bunds many hundreds of trees, old enough to dispense with attention and to defy the ravages of camels, have had to be cut down or abandoned to fall into the river.

5. To avoid similar losses in future, avenues are now being planted further in land, but less successfully, owing to the greater depth of the spring level, and the increased difficulty of watering the trees in the dry season. The percentage of failures from this cause alone is heavy, but even of those trees which survive the drought a large number are destroyed by camels in spite of frequent and heavy fines inflicted on their owners.

During the last cold weather the camels were more than usually destructive on account of the prolonged drought in the Pachâd tract. This is their ordinary grazing ground, but fodder there has recently been so scarce, that the herdsmen deemed a good feed on the shisham trees well worth the risk of even a heavy fine.

6. *Establishment.*—There are two mates, and a staff of malis and bhishtis, about 30 in number on an average.

7. The following table shows the expenditure during the period under review :—

	1884-85.	1885-86.	1886-87.
	Rs.	Rs.	Rs.
Watering	2,657	2,680	2,715
Maintenance of nurseries ...	459	287	271
Planting out	231	876	296
TOTAL ...	3,347	3,293	3,282

The receipts were as follows :—

1884-85.	1885-86.	1886-87.
Rs.	Rs.	Rs.
1,490	1,031	1,351

It is to be pointed out that as plantation operations only date back some 25 years, the trees are still too young as a rule to command a high price.

Trees are rarely sold unless threatened by the incursion of the river, or when they have been blown down by storms, or felled owing to alterations and improvements to the canals. Few of the shisham trees have much heartwood and they are therefore as yet of little value as timber. There are few roads and hardly any carts in the District, so that the difficulties of transport practically limits the market for even fine trees to the purchasing power of the zamindars in the immediate vicinity, who are generally very poor. These reasons explain why the annual receipts by sales of wood are so small.

There can be no doubt however that with the growth of the trees their capital value is rapidly increasing in much greater proportion than the annual expenditure, including the accumulated loss of interest.

MUZAFFARGARH CANAL DIVISION.

1. The total number of trees for the three past years is as follows :—

1884-85	...	...	142,665
1885-86	...	...	139,493
1886-87	...	...	131,046

Among these, however, the only trees that have any market value are the sissoo or shisham and the kikar. The figures for these are as follows :—

Year.	*Sissoo.*	*Kikar.*
1884-85 ...	17,736 ...	19,724
1885-86 ...	15,722 ...	21,955
1886-87 ...	14,370 ...	20,443

With the exception of a few hundred trees grown in Inspection bungalow compounds and on embankments, the trees are all of spontaneous growth.

From the above figures it would appear that there is a serious falling-off in the number of trees. It was not, however, till the spring of 1886 that the enquiry into what should be considered Government channels and what private channels were concluded, and therefore the previous counts would be useless for comparison. Even now there will always be a number of trees whose ownership cannot be decided without an enquiry in each case.

The income was Rs. 4,731 as compared with Rs. 2,915 of previous year, or an increase of Rs. 1,816. This is due to more of the inferior woods such as tamarisk, &c., being sold for fuel for Railway works, and the sale of good sissoo, cut down in widening certain channels.

The expenditure was Rs. 538 as compared with Rs. 584 in previous year—the decrease being Rs. 46. Expenditure was chiefly incurred in pay of malis for compound of Inspection bungalow. The Paharpur plantation was abandoned, as the trees, after promising well in the first few years, were attacked by whitcants ; whiteants appear to attach trees of 2 to 4 years growth that cannot be swamped with canal water.

SIRHIND CANAL, 3RD DIVISION.

The operations in arboriculture in this Division will be treated of under the following heads :—

I.—Nurseries
II.—Avenue.
III.—Groves.
IV.—Expenditure.
V.—Income.

Separate forms have been prescribed for each of the above heads.

I.—Nurseries.—Twelve small nurseries have been maintained for the purpose of producng shisham, mangoe, jaman, jamoa, bamboo, palm, mulberry and tun trees for the avenues and chouki compounds. These are distributed as follows :—

		A.	R.	P.
4 on the Main Line aggregating	...	2	2	27
4 „ „ Abohar Branch „	...	0	3	38
4 „ „ Bhatinda „ „	...	5	3	15
TOTAL	...	9	2	0

As transplanting is a costly way of producing trees it has been adopted to a very limited extent, and consequently large nurseries have not been required. The seed chiefly sown during the last two years has been that of mangoe, jaman, jamoa and tun trees. As nearly all the Canal plantations consist of shisham and kikar at present, and it is desirable to have some other kinds introduced.

The nurseries on the Abohar Branch are watered by flow irrigation ; all the other are watered by hand.

The seedlings in the nurseries are thriving and as good generally as could be wished.

II.—Avenues.—The following table is an abstract of the avenue statements for the last three years:—

Year.	Length of avenue of single line of trees at beginning of year.	Length of single lines planted during year.	Length of single lines which have failed or been cut down.	Length of single lines of avenues at end of year.	Remarks.
	Feet.	*Feet.*	*Feet.*	*Feet.*	
1884-85 ...	1,61,718	12,000	...	1,73,718	Total length of Canal 8,56,760 ft.
1885-86 ...	1,73,718	11,500	44,700	1,40,538	
1886-87 ...	1,40,538	3,03,176	46,424	3,97,290	

In 1885-86 26,000 feet of an avenue was cut down on the Main line to make room for the telegraph line, and this was the principal cause of the total length at the end of that year being so much less than at the beginning. Transplanting having been found costly was not practised to any extent for several years except for bridge ramps and chouki compounds. In 1886-87 a line of avenue trees were sown in pits 10 feet apart along the whole length of the Main line on the left (patrol) road bank. Considerable lengths of the right bank road were also sown in the same way. Shisham seed was sown, germinated well, and the young seedlings are on the whole progressing favorably. The total length sown in this way was

2,86,150 feet. Several seed were sown in each pit and the worst seedlings are being weeded out as they grow up, so that finally only the fittest will remain. The advantages of this system are that the first cost is small and casualties are fully provided for from the first. The disadvantage is that protection is required for a longer time than for transplanted seedlings. On the whole it so far promises to be successful and at a moderate cost.

A good many rare trees are being planted in the patrol road avenue Main line.

Avenues on the branches of the canal are almost entirely confined to bridge ramps and Choki compounds.

III.—Groves.—The grove on the Sirhind canal consist almost entirely of the plantations on the spoil banks ; spare ground outside the banks and in chouki compounds.

General condition of plantations Main line.—Length 39 miles.

0 to 18 miles, 26 to 39 „ } Banks fairly well wooded and trees on the whole thriving very well.

18 to 26 miles { Trees very far apart and in some parts none at all except the avenues. Existing trees not thriving well.

In the reach last mentioned the soil is very bad and sandy, and it will never grow good trees.

Combined branches.—Length 2·2 miles.

0 to 2 miles ... Banks fairly well wooded. Throughout soil bad.

Abohar Branch.—Length 48 miles.

0 to 23 miles, 25 to 44 „ } Banks fairly well wooded. Trees very thriving.

23 to 25 miles, 44 to 48 „ } Very few trees ; soil contains a great deal of kunkar and is generally unfertile.

Bhatinda Branch.—Length 82 miles.

0 to 39 miles { Banks thinly covered but numerous blanks exist. The soil is sandy and contains a good deal of kunkar.

39 to 82 miles { Very few trees, in many miles none, and what are, have been sown lately. Country intensely dry. Soil very fair.

Rainfall.—The rainfall may be regarded as having, on the whole, been of the average amount. The difficulty so far as growing trees is concerned consists in (1) the total fall except at Rupar and Cham kour usually being small, and (2) in the long breaks (very liable to occur on the branches of the canal) drying up the seedlings. It is very difficult for young trees to survive the drought if the bulk of the annual rain is received in a few heavy falls.

The following table shows the areas for the whole Division. If further details of the distribution of these areas are required, they are procurable from the tabular statements of groves submitted annually :—

Year.	Area stocked with trees at beginning of year.	Area planted during the year.	Area on which cultivation has failed or trees been cut down.	Area stocked with trees or plants at end of year.	Remarks.
	Acres.	*Acres.*	*Acres.*	*Acres.*	
1884-85 ...	2,595	726	37	3,284	Area available for planting of groves 5,899 acres.
1885-86 ...	3,284	1,917	1,216	3,985	
1886-87 ...	3,985	2,465	2,358	4,091	

Kind of trees.—The groves consist almost entirely of kikar and shisham with small areas of ber and mulberry.

Sowing.—The principal part of the groves have been grown from seed sown broadcast on the spoil banks when the earth was freshly thrown up or from seed sown in plough furrows made across the ground at intervals of 10 to 15 feet apart. Both these systems answered where the ground to be sown had a coat of spoil earth over it, but only when this was the case.

During the last two years it has been the practise to dig pits one foot diameter and deep before the rain to fill the earth in as the rains were commencing and to sow two or three kikar or shisham seed on the top of it, burying it to a depth equal about its own diameter. As far as cheapness of execution and germination of the seed was concerned, this system answered. Watering was too costly to be attempted. The young seedlings grew satisfactorily until the first long break in the rains occurred, when they dried up over a great part of the areas sown. It is believed that without artificial watering, subsequent failure would have occurred during the breaks in the rains of the last two years, whatever system had been followed.

The parts of the banks remaining to be sown are the hardest and least fertile tracks on the Main line. Combined and Abohar Branches—parts which have in fact failed repeatedly before under other systems.

On the Bhatinda Branch all the ground in the last 42 miles of the 82 miles in this Division is sandy and intensely dry. In future it is proposed to only try kikar seed in such parts and to at once re-sow when from any cause the seed sown has failed. Also whenever practicable on the Abohar and Bhatinda Branches the ground will be irrigated.

Nearly all the blank parts of the canal banks were sown in 1886-87 and this will be done again in 1887-88, but kikar only will be sown. If the rains are favorable it will be possible to stock a great part with young trees. The parts of the Canal banks where sowing remains to be done are chiefly as follows :—

Main Line	12 to 26	miles.
Combined Branches	1 to 2	„
Abohar Branch	23 to 25	„
	44 to 48	„
Bhatinda Branch	2 to 3	„
	4 to 8	„
	20 to 23	„
	39 to 42	„
	45 to 53	„
	57 to 59	„
	63 to 82	„

All these lengths have already been sown once and some trees exist on them. The greater part of the sowing remaining to be done is on the Bhatinda Branch from 40 to 82 miles.

Transplanting.—Was only practised for groves in the case of Chouki compounds.

Watering.—No watering whatever was done to groves except in the case of chouki compounds where flow irrigation could be got.

Thinning and felling.—Was done on the Main line and Abohar Branches wherever called for. The Bhatinda Branch plantations were not old enough to require thinning. The kikar trees on the inferior land of the Main line have been dying a good deal. The only explanation of this which can be given is that the roots have got down through the soft spoil to the hard natural earth below. The trees on the spare land at Rampur were all felled in 1885-86 (except saplings) preparatory to the ground being relinquished.

Fencing.—Has only been erected round small groves at Rupar, Akalgarh and round the nurseries.

The canal plantations consists of long strips which for the area enclosed would require a deal of fencing.

IV.—Expenditure.—The following table shows the expenditure incurred during the last three years for the whole Division:—

Year.	Nurseries.	Maintenance and repairs.	Extension of avenues and groves.	Total.
	Rs.	Rs.	Rs.	Rs.
1884-85	688	5,829	3,256	9,773
1885-86	1,171	5,940	3,994	11,105
1886-87	1,683	3,836	3,244	8,763
Total ...	3,542	15,605	10,494	29,641
Mean ...	1,181	5,202	3,493	9,880

The expenditure will continue to decrease as regard groves, but there will be some increase on account of avenues.

V.—Income.—The following table shows the income realized during the last three years for the whole Division:—

Year.	Avenues and groves.	Outlay as above.	Surplus.	Deficit.
	Rs.	Rs.	Rs.	Rs.
1884-85	9,281	9,773	...	492
1885-86	14,580	11,105	3,475	...
1886-87	8,466	8,763	...	297
Total ...	32,327	29,641	2,686	...

There has been a rapid decrease in the receipts for grass and unfortunately in those for dead trees. At present the grazing on the Abohar and Bhatinda Branches is not let on account of the damage which would be caused to the young trees. The cutting of grass is let, but that does not fetch such good returns as grazing.

SIRHIND CANAL, 4TH DIVISION.

Rainfall.—The district through which the portion of the canal in this Division passes is very dry and sandy and the rainfall scanty and uncertain. In the three years under review the rainfall was precarious and below the average, while the larger portion of the rain in the monsoon season fell in the first month or two, and was followed either by a long break or total cessation during the months of August and September which are the most vital months for the growth and success of plantations. The statement annexed shows the total rainfall in each year, as registered by Canal guages at Canal stations.

Rainfall Statement, 4th Division S. Canal.

Name of Canal.	Name of Station.	Name of Tahsil or State.	Year 1884-85.	Year 1885-86.	Year 1886-87.	Average of three years.
S. N. Channel ...	Ferozepore ...	Palla ...	8·5	9·5	17·3	11·8
Do. ...	Do. ...	Phidda ...	17·2	13·6	17·9	16·2
Abohar Branch ...	Moga ...	Gholia ...	14·6	19·1	21·3	18·3
Do. ...	Faridkot ...	Daipie ...	12·7	11·0	11·2	11·6
Do. ...	Muktsar ...	Maharajwala ...	13·2	6·3	10·3	10·0
Do. ...	Fazilka ...	Gobindgurh ...	5·0	9·3	7·3	7·2
Bhatinda Branch ...	Patiala ...	Rackai ...	...	7·4	13·8	10·6

In the first years of plantation operations and until the canal was opened and kept constantly flowing, dependence had to be placed entirely on the rainfall for producing germination and for supply of nourishment to the seedlings, the results obtained were therefore generally poor. In the first two years under review sowings were also generally made dependent on rainfall, except line trees transplanted on bridge ramps and in chouki compounds which were hand-watered, and a few isolated cases when flow irrigation was successfully arranged for. In the last year sowings were principally done at places where flow irrigation was obtainable and the results were a much lower percentage of failures and a greater extent of bank brought under plantation. Generally it may be laid down for this district that very minute return may be expected, if nourishment from rainfall is solely depended on while success is certain and quicker wherever irrigation is resorted to.

Sutlej Navigation Channel.—The operations carried out on this canal previous to the year 1884 are not exactly known, but some very successful results in avenue plantations were obtained. At the sites of most of the falls and bridges for half a mile and more above and below, avenues of shisham have been planted along the right boundary road and have thriven. In some parts of the canal where spoil was heavy, kikar seed was evidently sown on the freshly thrown up earth, and flourished producing very fair groves of trees, but these successful cases are few and form a very small percentage of the area of bank to be planted out. One or two chouki compounds were successfully planted out.

In the latter part of 1883-84 and during 1884-85 the following plantation work was taken in hand, the canal having then begun to irrigate. Water was taken by means of a wooden shoot fixed in the Chirak fall, 5th mile along edge of left patrol bank, and plantations sown and irrigated for a couple of miles down, these consequently flourished well. Water was also taken from the head race of Ghall Mills, and left spoil bank irrigated for a length of two miles ; the result being a fine flourishing plantation. Two large mangoe gardens were planted out with mangoes and orange trees at Gill 10th mile and Feroze Shah 33rd mile ; the former was first watered by hand and subsequently by flow irrigation direct from the canal, and the latter garden was irrigated from the water-course drawn from the Ghall Mill channel. These mangoe gardens have not proved a success : the seedlings do not flourish, whatever may be the cause, whether the light nature of the soil (containing "reh" salts) or the abundance of whiteants in the soil ; the seedlings constantly die and are being as constantly replaced. At Feroze Shah, with a fair command of water, scarcely a seedling has survived, and it will probably be decided to definitely abandon the site as a mangoe garden.

The planting out of bridge ramps with line trees and of the islands around the lock-keepers huts, between lock and fall, was started.

In 1885-86 the whole of the spoil banks on both banks in the first 10 miles from the head were sown with kikar and shisham both broadcast after ploughing up, and in pits dug 10 feet apart, but owing to the insufficient rainfall in the monsoon months the seeds either did not germinate or the young plants which sprung up died off again from the prolonged drought.

All bridge ramps were planted out with line trees and watered by hand, and these have generally flourished in places, though the system is costly and failures frequent.

In 1886-87 it was intended to resow selected lengths in the first 10 miles, which failed the previous year, and water by lift, as spoil is high, but the early rainfall, and the disastrous damage done to the canal, the repairs of which called for the entire energies of the staff and all local labour, prevented the work from being taken up. But little sowing was done, and that very late, and existing plantations and trees were generally maintained and renewals done. At lower end of canal a wooden shoot was fixed in the Ugoki fall 36th mile, similar to that at the Chirak fall and water taken nearly as far as Walour. Seed was sown wherever high spoil did not exist, but the plantation was not looked after by the subordinates and has not been very successful. The length will be again sown in the current year. The net result of operations so far is that probably about $\frac{1}{10}$th of spoil banks more or less show trees growing while ridges, ramps and chouki compounds are fairly well stocked. The great want is water on the plantation. In 1887-88 it is proposed to put in a head in the Dhulkote Rajbaha and irrigate for 2 or 3 miles as far as Baraghar falls on left bank, also to draw water from the Baraghar Mill Channel and water as far as Phidda. Perhaps an outlet in the Jagraon Rajbaha and one of its minors may command some portion of the right bank below Gill. For high spoil and on right bank, water must be lifted, and it is proposed to use a stream wheel if this can be arranged so as not to interfere with the passage of boats.

Abohar Branch.—Previous to 1883-84 when the Canal began to irrigate, but little useful results were obtained and that only in the Gholia Sub-Division. On left bank above the Gholia fall trees have flourished in the land occupied as the silting reach of the tail length of the Manoki Rajbaha. Also there is a fine kikar plantation for a mile or so in the high banks or both banks below the Chinowal fall. But nearly all the present success has been gained since the opening of the canal. In the latter part of 1883-84 and in 1884-85, the following work on plantations was carried out. A plantation made on right bank above Gholia fall sown with shisham and watered from the Baga Rajbaha. This plantation has been successful. A plantation on left bank below Chinowal in 61 and 62 miles where the Sibian Rajbaha takes up the boundary ditch and watered from that Rajbaha. Plantation on right bank below Chinowal watered from the Datewal minor.

Both banks of mile 114 were sown and watered from the Aspal and Sarawan Rajbahas. In mile 125 left bank was sown and watered from the tail of Sarawan rajbaha. Other lengths of bank were sown, but as there were no watering arrangements the seed failed. Nearly all the three existing canal and rajbaha choukis were planted out and transplanting of avenue trees along bridge ramps commenced. Also mangoe gardens were planted out on left bank at Dhaipie 77th mile, Maharajwala 103rd mile, and Alamwala 110th mile.

In the year 1885-86 the plantations of previous year were maintained and extended, and renewals done. Seed was also sown on both banks on the high spoil in miles 122, 123, 124 near Gobindgurh chouki and hand watered ; these have succeeded. New chouki compounds were planted out, and all bridge ramps supplied with line trees.

In the year 1886-87 the plantations were greatly extended and good progress shown. It was determined to take up only those lengths of bank commanded by flow irrigation and to water by outlets fixed in rajbahas, and minors and silting banks.

An outlet was fixed in Manoki rajbaha left bank, just above the tail fall into Canal and water taken along left patrol bank, and arrangements made for sowing 2 or 3 miles of spoil. A portion of this length was sown in the year. The plantations watered by the Sibian rajbaha and Datewal minor were extended. Outlets were placed in Minors Nos. 2 and 3 Sibian (and No.

9 Boya on right bank) and a length of left bank sown. Both banks were sown in miles 100 —102, 107, 110—113, 119, and parts of 122 and 123 and watered by flow. New rajbaha chouki compounds were planted out ; line trees were planted out for 11 miles in all, along Arniwala Rajbaha and Escape and Jaitie rajbaha, also about 140 acres of the Reservoir were sown and arrangement made for regularly watering this area. In all nearly 400 acres of sowing were carried out, and it is believed that there is only a small percentage of failure.

For the current year it is proposed to complete and extend the areas commanded by flow in the plantations started last year and to take up all other lengths when water can be obtained. It is also proposed to put up one or two stream wheels in the Canal, to water high spoil requiring lift, or the compounds of such choukis as Dhapie and Samalsar.

Bhatinda Branch.—The digging of this canal in this Division was only started in 1885-86 and plantation operations have been going on for two years only. In 1885-86 the new spoil banks were extensively sown broadcast and below the Teona fall on left bank where no spoil exist. Seed was sown in pits dug 10 feet apart in the original soil. The greater portion of the 18 miles of canal was dealt with in this way. But experience has convincingly shown equally with Abohar Branch that no successful results may be expected by dependence on rainfall, and that flow irrigation must be provided. The rainfall at the lower end of the Bhatinda Branch is less than on Abohar Branch and very precarious, the heat is very great and the soil is very sandy. But very good results in plantations can be obtained in this sandy soil, if only water is given to it. Some of the seed on the fresh earth of the new spoil banks germinated, and trees sprung up, but have withered away again for want of moisture ; the seeds in pits never germinated. Two nurseries were formed at Payvari and Baihman temporary quarters and trees transplanted into compounds of two canal choukis.

In 1886-87 seed was again sown on spoil in the rains, but again failed, but in the cold weather arrangements were made for converting the left boundary ditch into a plantation Minor from below the Teona 89 mile fall having a head in the Teona rajbaha. This minor will command almost the whole area of spoil land to the 100 mile, and when completed and the land sown will suffice to raise plantations in these 10 miles. When the arrangements on the left bank have been completed, the land on right bank will be similarly dealt with. It is hoped that large results will be reported on plantations for the year 1887-88.

In 1886-87 three rajbaha chouki compounds were planted out, and along some 4 miles of Kot Bhai rajbaha line trees were planted on boundary road.

SIRHIND CANAL, 5TH DIVISION.

I.—Nurseries.—There are three small nurseries on the Feeder line at Dhamote, Bherthla and Rohti. That at Dhamote was all planted out but will be remade. The Bhoray nursery has been abandoned; a new nursery was just commenced at Rohti at end of year.

On the Kotla Branch are 6 nurseries (besides 2 or 3 smaller plots intermediate to the larger ones) at Mohorana, Raipur, Bundher, Bhaini, Jodhpur and Kot Bakhtu. The trees are mostly of one year's growth ; it was a bad habit to transplant very small trees of the first year which seldom came to anything. This arrangement has been stopped.

On the Ghuggar Branch the main nurseries is at Thui with a little area at Gujian which has not been satisfactorily worked. The trees are as above but the Thui nursery is making good progress.

On the Choa Branch a nursery was just being started at Dakraba.

On the Patial Navigation Channel a nursery was being started at Lihal.

There is difficulty about watering these nurseries. Raipur, Kot, Bakhtu, Thui, Gujran and Dakraba are watered by flow, the others by lift. The new plants are healthy and of good kinds, but small as yet because of former neglect of nurseries.

II.—Avenues.—The following table is the abstract of the avenues statement of last three years as far as known :—

Year.	Length of single lines stocked with trees or established plants at the beginning of the year.	Length of single lines planted during the year.	Length of single lines on which cultivation has failed on which trees or established plants have been destroyed or felled.	Length of single lines stocked with trees or established plants at the end of year.
	Feet.	*Feet.*	*Feet.*	*Feet.*
1884-85 ...	...	*No information.*	...	23,800
1885-86 ...	23,800	60,600	16,300	68,100
1886-87 ...	68,100	2,35,050	63,200	2,39,950

The list shows much letter than the reality. Except along the Patiala Nabha road there are no good line trees, the rest consist of small trees transplanted near bridges and masonry works or small trees transplanted or sown on considerable lengths which may indeed be alive but this is all that can be said, and probably the mass will come to nought for they were transplanted so small and so much injured by cattle that they are very miserable. The protection is so difficult that it is believed that it will be far best to transplant large trees and protect carefully as long as required than to attempt to raise from seed or transplant small plants.

In some cases the bridge ramp trees are doing well, greater efforts for protection are now made.

III.—Groves.—The groves are all on the spoil banks or space between the canal road and boundary, or in the compound.

The trees of any size are mostly kikar which have done well in places ; in a very few places shisham are doing well. A few siris trees are large but the better kinds of trees are only in compounds or quite small.

The Feeder line 4 miles was all sown with kikar but is in a patchy condition, hardly any part being thick with trees and hardly any parts quite bare, though there are large patches of kallar here and there which are very difficult to cultivate. Extensive kikar sowing in 1886-87 failed for want of rain.

The Kotla Branch 98 miles has been nearly all sown with kikar seed, but below mile 48 there is very little to be seen ; the drought always great has been intense the last two years. In a few places such as miles 17, 18, 19, the kikar is very thick, but generally the trees are not very close and only doing tolerably. The shisham at present are small and not numerous ; the better kinds of trees are all very small.

The trees in the compounds are doing well, especially at Mohorana and Bundher.

Watering is only occasionally possible. If watering direct from canal were permitted where it could be done with safety it would facilitate matters. As it is, plantations are a great difficulty in the lower parts of the canal.

On the Ghaggar Branch (52 miles) all was sown with kikar, a few miles are thick, such as miles 23, 24, 45, 46, but generally the trees are not very thick and the shisham trees are not numerous, except in miles 25, 26, where they are small. The other trees are all very small.

On the Choa Branch, 24 miles, there is practically nothing. The soil is bad, the ground is high and sandy, or else there are deep borrow pits.

On the Patiala Navigation Channel, 6 miles, the trees that exist are of good size and of various kinds.

The following table shows the rainfall at several stations in the Division :—

Station.	Canal.	Rain-fall.			Average rain-fall.	
		1884-85.	1885-86.	1886-87.	Amount.	No. of years averaged.
Bherthla	Feeder Line ...	22·80	28 02	18·32	24·58	11 years.
Bundher	Kotla Branch ...	22·05	22·25	13·16	20·04	5 „
Gujran	Guggar „ ...	24·82	25 67	13·31	18·70	9 „
Ghaneta	Choa „ ...	28·62	35·36	18·54	23·41	7 „
Lehal	P. N. Channel ...	33·07	37·63	18·97	25·42	13 „

7. The following table shows the areas for the whole Division including old Independent Sub-Division :—

Years	Area stocked with trees at beginning of year.	Area planted during the year.	Area on which cultivation has failed or trees have been cut down.	Area stocked with trees or plants at end of year.	Remarks.
1884-85	...	...	...	1,557	
1885-86	1,557	250	315	1,492	
1886-87	1,492	126	326	1,292	

The principal groves have been grown from broadcast sowing on the spoil banks where the earth was freshly cast up or in plough furrows 10 feet apart. This generally answered in fresh spoil, but not always; lately sowing has been in pits at 10 feet intervals, but this has not been successful. Where there is kallar soil or the land is covered with borrow pits it is of course the worst for plantations. Kikar seed is by far the most successful, it stands drought better and cattle (camels excepted) &c., do not destroy it as they destroy others.

Transplanting was principally used for chonki compounds and has answered well.

Thinning and felling was only carried out in miles 17, 18, 19 Kotla Branch, and on Patiala Navigation Channel, except the thinning out of seedlings which was required in a fair number of places especially on the Kotla Branch.

Fencing has been carried out as far as the wire permitted.

The line fence (agave) has been unsuccessful, kikar and phallai are now being tried. Protection is the great difficulty.

IV.—Expenditure.—The following table shows the expenditure incurred during the last three years :—

Year.	Nurseries.	Maintenance and Repairs.	Extension of avenues and groves.	Total.
	Rs.	Rs.	Rs.	Rs.
1884-85	2,802	6,219	.....	9,021
1885-86	1,670	5,159	.....	6,829
1886-87	1,739	1,972	4,336	8,047
Total ...	6,211	13,350	4,336	23,897
Mean ...	2,070	4,450	4,336	7,965

V.—Income.—The following table shows the income realized :—

Year.	*Avenues and groves.* Rs.
1884-85	... 2,367
1885-86	... 3,047
1886-87	... 1,807
Total	... 7,221

At present the income is very small ; there is little sale and not much to sell, still it will increase and the new Patiala Bhatinda Railway will create a demand, though it will be some time before it is a source of revenue.

PESHAWAR PROVINCIAL DIVISION.

It will be seen in the statement that during the three years there was a total increase of 192 miles of trees in the Division after deducting all losses. The trees were taken over or planted on the following roads :—

	Miles	Feet.
Lahore and Peshawar	27	2,774
Doaba outpost roads	42	2,800
Noushera and Murdan	27	3,470
Hazara trunk roads	32	1,600
Branch roads in Hazara District	62	
Total miles	190	10,644

Of the above number the 42½ miles on the Doaba outpost roads were transferred to this from the Military Works Division at Peshawar leaving a balance of 151½ miles planted out.

The trees consisted of the usual kind in each District. No record is kept of the several classes ; they were planted at intervals of 20 feet which gives a total in the three years of 39,590 trees.

5¾ acres of nurseries were kept up in the Peshawar District from which transplantings were effected. In the Hazara District there were no nurseries, the trees were obtained from other sources.

The total cost of all the planting operations was Rs. 6,916. This sum does not include the outlay in the first year 1884-85. In that year the outlay was charged to the ordinary maintenance of the roads referred to. The detail for each was as follows :—

Lahore and Peshawar roads	Rs.	1,718
Doaba outpost roads		3,197
Noushera and Murdan roads		626
Hazara trunk and Branch roads		1,375
Total Rs.		6,916

The cost per mile of trees was Rs. 36 and the cost per 100 trees was Rs. 13-12-0.

PESHAWAR PROVINCIAL DIVISION.

Statement showing the Progress made in road-side arboriculture during the three years ending 1886-87.

Year.	Trees planted.					Trees destroyed.					Balance at end of each year.					Remarks.
	Lahore and Peshawar roads.	Doaba Outpost roads.	Naushera and Murdan roads.	Hazara Trunk roads.	Branch roads in Hazara District.	Lahore and Peshawar roads.	Doaba Outpost roads.	Naushera and Murdan roads.	Hazara Trunk roads.	Branch roads in Hazara District.	Lahore and Peshawar roads.	Doaba Outpost roads.	Naushera and Murdan roads.	Hazara Trunk roads.	Branch roads in Hazara District.	
								Avenues.								
	m. ft.	m. ft.	m. ft.	m. ft.	m. ft.	m. ft.	m. ft.	m. ft.	m. ft.	m. ft.	m. ft.	m. ft.	m. ft.	m. ft.	m. ft.	
1884-85 ...	2 2,540	...	...	2 35	1 192	0 3,150	...	...	0 3,600	0 2,760	1 4,670	...	...	1 1,714	0 390	Doaba Outpost roads were transferred to this Division at the end of 1886-87, hence no progress shown against them in 1884-85 1886-87.
1885-86 ...	4 0	...	7 1,720	33 1,573	65 678	2 6	...	1 5,110	2 1,797	3 2,615	1 5,274	...	5 1,890	30 5,056	61 3,341	
1886-87 ...	24 750	42 4,600	23 130	2 179	1 2,265	0 2,640	0 1,800	0 3,830	2 69	1 168	23 3,390	42 2,800	22 1,580	0 110	0 1,597	
								Nurseries.								
1884-85 ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	* Small square patches at intervals along the road-side.
1885-86 ...	...	...	2 41	...	...	...	...	...	...	...	...	...	2 41	...	...	
1886-87 ...	...	*40,000 sft.	2 41	...	...	—	...	...	...	...	...	...	2 41	...	...	
								Cost.								
1884-85 ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Cost of plantation during 1884-85 charged to ordinary maintenance.
1885-86 ...	840	...	237	615	including Branch roads.			...	...	...	...	...	...	...	...	
1886-87 ...	878	3,197	389	760	...	...	...	...	...	...	...	...	...	...	...	

KOHAT PROVINCIAL DIVISION.

The operations of the past three years have been confined to planting out young trees in places where those formerly planted have died from climatic or other sources. A great man young plants failed on the Kohat and Khushalgarh road during 1886-87 owing to excessive drought, and their places are gradually being replaced by young plants from nurseries. There are very few trees on the road-side in this Division, and the arboriculture operations are extremely limited and scarcely worthy of report.

The expenditure on the three roads for 1886-87 is—

Kohat and Khushalgarh road 30 miles long	... Rs	669
Kohat and Bannu road in the Kohat District, 62 miles		5
Kohat and Hungu road, 26 miles	...	144
Total	Rs.	818

The trees that are planted are shisham, mulberry, siris, pipal, kikar and willow. The kikar and shisham thrive well and so do mulberry.

No new nurseries and groves have been established and no income has been realized.

The allotments on account of arboriculture are extremely small and admit of no extensive operations.

RAWALPINDI PROVINCIAL DIVISION.

During the past three years good progress has been made in tree-planting in the Rawalpindi Division. As however the work has been confined to filling in gaps in existing avenues and road-side groves, and in making small plantations alongside the road, where water stands all the year round, there has been but little to enter in the yearly returns submitted, which only take cognizance of entirely new groves or new lengths of avenues.

There is no special provision for arboriculture in this Division, the work is done out of the allotment made for the maintenance of the roads. The tree-planting in this Division is confined to the Lahore and Peshawar road.

Plantations.—The groves of trees in the different miles have been greatly improved during the period under review by the planting of shisham and kikar trees in the vacant places in them.

The kikar has been raised in trenches from seed. The shisham trees were put in when about 2 feet high.

Avenues.—Extensive planting of shisham and kikar trees has been made; 300 to 400 young trees having been planted in 31 different places.

The planting has nearly all been done in places where tanks were close to the road, and in many places advantage has been taken of earth being required for the road berms to excavate new tanks; these will in future years be utilized for tree-watering and at nearly all of them a few bargat trees have been planted and have taken root, these will be very useful for travellers to rest under when they are a few years old.

Nurseries.—Nurseries for shisham trees have been established in the plantations at miles 105, 113, 115, 130, 154, 186 and 218.

Deena nullah Bela plantation.—On the land pertaining to the Deena nullah training works, a plantation has been started and is now in a flourishing condition, there being about 2,500 or 3,000 young trees, (shisham, kikar, farash, drak and willow) in it. These trees are from 3 to 7 or 8 feet high and most of them healthy looking; attached to the plantation too is a small nursery.

UMBALLA PROVINCIAL DIVISION.

The Avenues in this Division are planted on the sides of the following roads :—

1. Grant Trunk Road from 1 to 161 miles.
2. Delhi and Sirsa Road for a length a little short of 16 miles.
3. Do. Gurgaon Road 158 miles.
4. Do. Muthra Road 1 to 28 miles.
5. Umballa and Kalka Road 34 miles.

GRAND TRUNK ROAD.

District.	Planted.	Failed.	Balances.
Delhi District.			
1884-85	13,200	1,450	11,750
1885-86	7,920	5,280	2,640
1886-87	20,000	8,000	12,000
Total. ...	41,120	14,730	26,390
Karnal District.			
1884-85	31,680	..	31,680
1885-86	...	50,393	—50,393
1886-87	15,100	17,520	—24,20
Total. ...	46,780	67,913	—21,133
Umballa District.			
1884-85	...	...	...
1885-86	10,560	1,050	9,510
1886-87	15,840	4,230	11,610
Total. ...	26,400	5,280	21,120

Grand Trunk Road.

The marginal tables will show that the net gain in length of Avenues in the Delhi Karnal and Umballa Districts has been 26,377 feet.

DELHI AND SIRSA ROAD.

	Planted.	Failed.	Balances.
1884-85	5,280	700	4,580
1885-86	6,500	...	6,500
1886-87	4,600	800	3,800
Total. ...	16,380	1,500	14,880

Delhi and Sirsa Road.

On the Delhi and Sirsa road, it will be seen that the increase in length of avenues has been 14,880 feet.

DELHI AND GURGAON ROAD.

	Planted.	Failed.	Balances.
1884-85	...	...	...
1885-86	...	790	790
1886-87	820	240	540
Total. ...	820	1,030	1,370

Delhi and Gurgaon Road.

On the Delhi and Gurgaon road, no plants were put down in 1884-85 and 1885-86, but in the latter year 790 feet were denuded of trees by a storm in the month of August. Of the 820 feet planted in 1886-87, 240 feet failed leaving a gain of only 580 feet, hence on this road there has been a diminution in length of avenues by 210 feet.

DELHI AND MUTHRA ROAD.

	Planted	Failed.	Balances.
1884-85	3,800	700	3,100
1885-86	10,560	5,280	5,280
1886-87	5,280	1,600	3,680
Total. ...	19,640	7,580	12,060

Delhi and Muthra Road.

There has been an increase of 12,060 feet in length of avenues during the past three years.

The descriptions of trees planted have been shisham, mangoes, nim, siris, kikar, pipal and jaman.

The failures on the above roads have chiefly been due to two causes—

(I). The occurrence of saltpetre in the soil.

(II). Destruction of full grown trees by storms and cattle. The last cause was particularly active in 1885-86 during the movements of troops to and from the Camp of Exercise, more especially in the Karnal District.

Various means have been tried to keep off cattle from young plants, but none have been found to answer as well as the plan of digging a trench round the plant about 3 feet deep from which the earth is thrown on the outside to form a wall.

In soil impregnated with saltpetre the plan has been tried of digging a pit in which good earth is filled, and in this planting the young tree, but this has met with indifferent success.

	Planted.	Failed.	Balances.
1884-85	...	...	...
1885-86	33,720	...	33,720
1886-87	17,730	5,940	11,790
Total ...	51,450	5,940	45,510

Umballa and Kalka Road 34 miles.

From the table on the margin it will be seen that the increase in length of avenues on this road has been 45,510 feet.

The failure of 5,940 feet is owing to the storms during 1886-87.

Nurseries.—During the first two years of the period comprised in this report, no nurseries were kept up in the Delhi and Karnal sub-divisions, and none at all in the Pipli and Kalka roads sub-divisions for want of funds during 1884-85. Portions of land in the compounds of the road bungalows on the roads in this Division were set apart for this purpose and planted with shisham, nim, kikar, and siris trees.

The establishment employed on maintenance of avenues on the road-sides were utilized to tend the nurseries.

JULLUNDUR PROVINCIAL DIVISION.

Income.—There is an increase of Rs. 4,523 against that of last year, and it is due to the addition of Ludhiana and Ferozepore sub-divisions to this Division ; in these sub-divisions a great number of dry or otherwise fallen trees were sold.

Expenditure.—There is also an increase of Rs. 1,189 of expenditure on avenues than that of the preceding year for the reasons given above.

Young shisham and mulberry plants were procured partly from the nurseries under Civil Officers and partly from the nurseries of this Department and planted in room of old and fallen trees disposed of by public auction.

Groves.—No plot or area of land is set aside for planting groves in this Division.

Avenues.—The avenues in this Division were maintained by sanctioned gangs of cooly establishment during the year under report at a cost of Rs. 1,790.

The length of line planted during the year under review is 1,24,610 feet, and the trees which have failed on the line amounts to 6,030 feet ; the failure is mainly due to the havoc wrought by the camp followings of troops, and also to excessive drought.

Nurseries.—The area planted during the year is 6 roods and 5 poles or 6 roods 5 poles more than last year. All these nurseries have been planted with large number of shisham, mulberry, mangoe, kikar and date trees.

DERA ISMAIL KHAN PROVINCIAL DIVISION.

Two separate Divisions were formed, one at Bannu in 1885 and the other at Dera Ghaz Khan in 1886 called "Frontier roads Divisions." The roads in the Districts of Bannu and Dera Ghazi Khan have consequently been omitted from the return of this Division for 1886-87.

Trees inside of Fort Akalghar.—No new trees have been planted during the years 1885, 1886 and 1887 in this place, and the old ones have been maintained by employing an establishment of bhisties for the sole purpose of watering them ; they are all now in a flourishing condition.

Trees on outside of Fort Akalghar.—Cultivation of new trees outside of Fort Akalghar has been discontinued ; all trees transplantable have been taken up and planted on the sides of North-West Frontier road, "Section from Dera Ismail Khan to Peyzoo." The trees now in existence on this length are watered by Bhisti establishment and are in good condition.

Trees on road round Fort Akalghar.—No new planting of trees on this road has been attempted for the last three years. The trees already planted are watered from the Loonee water supply for which an allowance of Rs. 30 per month is paid to Deputy Commissioner. They are in a flourishing condition.

Road leading past Telegraph office to main Gate of Hornwork.—The trees on this road are included in the trees on the road round Fort Akalghar, and were erroneously shown under a separate sub-head. The necessary corrections have been made in the return of 1886-87.

Road from Dera Ismail Khan to Peyzoo called North-West Frontier road.—There is an avenue from the beginning of the road to the end nearly of the 4th mile. In the 1st mile which is only 2,000 feet in length there are more trees than one single avenue ; this length now resembles a jungle more than a planted avenue ; a number of trees were planted in 1886-87, but not in lengths. As trees here and there had died, they were replaced by transplantable ones from the trees outside of Fort Akalghar. These are watered from the Loonee water and are in good condition.

Trees on road from Dera Ismail Khan to Tibbee.—No new planting of trees for the last three years has been made on this road, but a number of khagul trees have grown spontaneously at different places. Some trees had died owing to an insufficient quantity of water being available from the Loonee. They were replaced by fresh ones. Now all the trees on this road are in a flourishing condition as loonee water is available for them in sufficient quantities.